



Mitigation Strategy

C.1 Mitigation Strategy Handout

Placer County
Local Hazard Mitigation Plan Update
HMPC Meetings #3 & 4 - Mitigation Strategy Meetings
February 24 & March 2, 2021

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Jeanine Foster (jeanine.foster@fostermorrison.com)
Foster Morrison Consulting, Ltd.
(303) 717-7171

AGENDA



Placer County Local Hazard Mitigation Plan (LHMP) Update HMPC Meetings #3 & #4 - Mitigation Strategy Meetings February 24 & March 2, 2021

HMPC Meeting #3: (1.5 hours)

1. Introductions
2. LHMP Project Status and Next Steps/Timeline
3. Priority Hazards Review
4. Develop Plan Goals and Objectives
5. Introduction to HMPC Meeting #4: Mitigation Alternatives/Actions/Projects

HMPC Meeting #4: (2 to 2.5 hours)

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Review of Voting Process for Prioritization of Mitigation Actions/Projects
5. Questions

**Mitigation Strategy Meetings
February 24 & March 2, 2021
Day 1**

Status of the 2021 Placer County LHMP Update Project/Next Steps

LHMP Update Project Schedule/Key Dates

2021 LHMP Update Meetings

- **February 24** (Wednesday) HMPC Meeting #3 (Mitigation Strategy: Goals Development) (2:00-3:30 pm)
- **March 2** (Tuesday) HMPC Meeting #4 (Mitigation Strategy: Actions and Projects) (2:00-4:30 pm)
- **June 9** (Wednesday) Public Meeting #2 (6:00-7:30 pm)
- **June 10** (Thursday) HMPC Meeting #5 (2:00-4:00 pm)

Mitigation Strategy Meetings - Follow up

- **March 5** (Friday) Mitigation Strategy Actions and Projects processed and voting site launched
- **March 12** (Friday) Voting ends
- **March 19** (Friday) Foster Morrison to send Mitigation Action prioritization follow up to HMPC
- **April 9** (Friday) Planning Team Mitigation Action (Project) Worksheets due to Foster Morrison

LHMP Document Drafts

- **March 1 – 5** (M-F) Foster Morrison to send out draft Jurisdictional Annexes for input
- **April 9** (Friday) Jurisdictions to return updated Annexes to Foster Morrison
- **April 16** (Friday) HMPC (First) Draft LHMP to County
- **May 7** (Friday) HMPC comments due on Draft Plan
- **May 19** (Wednesday) Comments incorporated into Public Review (Second) Draft to County
- **May 26** (Wednesday) County to place Public Review Draft on County website
- **June 18** (Friday) all final Planning Team and Public input to Foster Morrison
- **June 30** (Wednesday) Public and HMPC comments incorporated and LHMP submittal to Cal OES – June 2021

Participating Jurisdictions

- County
- All 5 incorporated communities (have hazard data returned from all but 2 incorporated communities)
- 19 District Annexes – (have hazard data returned for all but 1 District)
- **25 Total Participating Jurisdictions**

Placer County Hazard Identification & Profiles

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Agricultural Hazards	Significant	Highly Likely	Critical	Medium	Medium
Avalanche	Limited	Likely	Limited	Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	–
Dam Failure	Significant	Occasional	Critical	High	Medium
Drought & Water Shortage	Extensive	Likely	Critical	High	High
Earthquake	Significant	Occasional	Critical	Medium	Low
Floods: 1%/0.2% annual chance	Limited	Occasional	Critical	High	Medium
Floods: Localized Stormwater	Limited	Occasional/Highly Likely	Limited	Medium	Medium
Landslides, Mudslides, and Debris Flows	Limited	Occasional	Limited	Low	Medium
Levee Failure	Limited	Unlikely	Limited	Low	Medium
Pandemic	Extensive	Likely	Catastrophic	Medium	Medium
Seiche	Limited	Unlikely	Limited	Low	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Freeze and Snow	Extensive	Highly Likely	Critical	Medium	Medium
Severe Weather: Heavy Rains and Storms	Extensive	Occasional	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Critical	High	Low
Tree Mortality	Extensive	Likely	Limited	High	High
Wildfire	Extensive	Highly Likely	Critical	High	High
<div> <div> Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area </div> <div> Likelihood of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year, or happens every year. Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years. </div> <div> Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact Climate Change Influence Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact </div> </div>					

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely:** Near 100% chance of occurrence in next year, or happens every year.
- **Likely:** Between 10 and 90% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional:** Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely:** Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low:** The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low:** Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium:** Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High:** Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High:** Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences:** Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences:** Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures:** This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Placer County Priority Hazards

- Agricultural Hazards
- Avalanche
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide, Mudslide, Debris Flow
- Pandemic
- Severe Weather: Extreme Heat
- Severe Weather: Freeze and Snow
- Severe Weather: Heavy Rains and Storms (hail, lightning)
- Severe Weather: High Winds and Tornadoes
- Tree Mortality
- Wildfire

Non-Priority Hazards:

- Levee Failure
- Seiche

Jurisdiction: _____

Priority Hazards???

- Agricultural Hazards
- Avalanche
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Landslide, Mudslide, Debris Flow
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- Severe Weather: Extreme Heat
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- Severe Weather: Heavy Rains and Storms (hail, lightning)
- Severe Weather: High Winds and Tornadoes
- Tree Mortality
- Wildfire

Data Needs

Review of Key Items to Date

- Hazard-specific data
 - ✓ Hazard ID tables
 - ✓ Historic Hazard Worksheets or list of past hazard occurrences and impacts to each jurisdiction
 - Old participating jurisdictions – need past occurrences/hazard history since 2016
 - New participating jurisdictions –significant hazard occurrences - back 50 years or so
 - PA Summaries from 2017 Disaster Declarations for affected communities
- Risk Assessment Worksheet (County)
 - ✓ Data on future development areas (County/Cities)
- Status updates to 2016 Mitigation Actions/Projects

Other Data Items

- Logos for each participating jurisdiction
- Photos, Photos, Photos
- Updated Goals Statements **by March 5th**
- New/Carry over Mitigation Action Worksheets due **by April 9th**
- Jurisdictions to return updated Annexes to Foster Morrison **by April 9th**

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

6. Mitigation Goals
7. Mitigation Actions
8. Mitigation Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the Placer County Local Hazard Mitigation Plan Update. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Placer County Planning Area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead to incorporating these improvements into the Mitigation Strategy portion of the LHMP. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the Planning Area and Participating Jurisdictions more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation, cost, schedule, and means are not considered. ***Goals are public policy statements that:***

- **Represent basic desires of the jurisdiction;**
 - **Encompass all aspects of planning area, public and private;**
 - **Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;**
 - **Are future-oriented, in that they are achievable in the future; and**
 - **Are time-independent, in that they are not scheduled events.**
-
- ❖ ***While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.***
 - ❖ ***Goals statements will form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.***
 - ❖ ***The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.***
 - ❖ ***Consider other planning area goals from other regional/county/city programs, plans and priorities.***

Types/Sources of other area mitigation plans/ programs include:

- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans, Urban/Integrated Regional Water Management Plan
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Adaptation Plans
- Other?

2018 State Plan/2016 Placer County LHMP Goals

Goals from the 2018 California State Hazard Mitigation Plan

1. Significantly reduce life loss and injuries.
2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.
3. Protect the environment.
4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

Placer County 2016 LHMP Update (This is what we are updating)

Goal 1: Minimize risk and vulnerability of Placer County to the impacts of natural hazards and protect lives and reduce damages and losses to property, economy, public health and safety, and the environment.

- Minimize economic and resource impacts and promote long-term viability and sustainability of County resources
- Minimize impacts to both existing and future development from all hazards (through well-planned communities)
- Minimize impacts to natural and cultural resources
- Minimize impacts from climate change
- Minimize impacts to watersheds/Promote watershed health
- Prevent and reduce wildland fire risk and related losses
- Prevent and reduce flood risk and related damages, with a focus on repetitive loss structures and infrastructure

Goal 2: Provide protection for critical facilities, infrastructure, utilities and services from hazard impacts.

- Provide protection for critical infrastructure from the wildland fires, floods, and severe storms/weather (e.g., repeaters, cell towers, water tanks, utilities)
- Improve infrastructure/system reliability for critical lifeline utilities, including stormwater systems, roadways (evacuation routes, emergency services and supplies); rail lines, and pipelines.
- Minimize risk of loss of life and injury to At-risk Populations

Goal 3: Improve public awareness, education, and preparedness for all hazards.

- Enhance public outreach, education, and preparedness program to include all hazards of concern (e.g. fire restrictions, water conservation measures, hazardous vegetation, air and water quality issues)
- Increase public knowledge of the risk and vulnerability to identified hazards and their recommended responses to disaster events to reduce losses
- Educate general public on evacuation planning and sheltering options for all hazard types and to encompass all groups (e.g., residents, visitors, second homeowners, vulnerable populations, animals)
- Increase community awareness and participation in hazard mitigation activities to include defensible space, hazardous vegetation abatement projects, and forest management projects and practices to reduce flood risk on private property
- Utilize multiple public outreach avenues such as schools, new technologies, and social media
- Coordination with other regional jurisdictions to facilitate (consistent/coordinated) public information function prior to, during and after an event (e.g., facebook, twitter, everbridge, web, tv, radio)

Goal 4: Increase communities' capabilities to mitigate losses and to be prepared for, respond to, and recover from a disaster event.

- Continued enhancements to Emergency Services capabilities integrating new technologies to reduce losses and save lives
- Improve interagency (local, state, federal) emergency coordination, planning, training, exercising, and communication to ensure effective community preparedness, response and recovery
- Improve interagency coordination with respect to implementation of mitigation activities such as fuels reduction and other multi-jurisdictional wildland fire projects
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Maintain current service levels/provide for enhanced service levels
- Increase first responders awareness of vulnerable populations and other priority needs during a hazard event;(use of technology to pre-identify and communicate)
- Utilize lessons learned (debriefing) to improve response capabilities
- Promote efficient recovery from incidents to minimize impacts to lives, environment, and economy

Goal 5: Maintain FEMA Eligibility/Position the communities for grant funding.

- Continued compliance with the NFIP/enhancement of floodplain management program through participation in the NFIP's Community Rating System (CRS) where feasible.

Example Goal Statements

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

General Recommendation for Categories of Goals

- Reduce Losses/Protection of Life, Property, Public Health, and the Environment from all Hazards
- Reduce Losses/Protection of Critical Facilities and Infrastructure from all Hazards
- Public Education
- Increase County Capabilities to all Hazards
- Any Hazard-specific goals

Goals Development

The purpose of goal's development is to reach a consensus on updated goals for the Placer County 2021 LHMP Updates. Provided above are example goals for this LHMP and goals from the previous 2016 Placer County LHMP. *You may reword those above or develop your own updated goals.*

Each person should provide either via chat (on this zoom call) or email to Jeanine.foster@fostermorrison.com: Two (2) goals they would like to see included for this 2021 Placer County LHMP Update. (Please submit by Friday, March 5th)

When collated, we will combine and rework them into 4-6 goals for this LHMP Update and send them out to the HMPC for further review and refinement.

**Mitigation Strategy Meetings
February 24 & March 2, 2021
Day 2**

Mitigation Strategy Action Development: Ground Rules

Rule 1: All Participating Jurisdictions **MUST** have a Mitigation Action/Project to address each of their Priority Hazards (those rated as a high or medium significance in their respective Hazard Identification table).

Rule 2: Every Mitigation Action/Project **MUST** be supported by Risk Assessment Data contained within Chap 4 of the Base Plan and/or within each Participating Jurisdictions' Annexes. Note: this might necessitate backfilling the hazard risk assessment data.

Rule 3: The Mitigation Actions/Projects for this 2021 LHMP Update should reflect each Participating Jurisdictions' WISH LIST for mitigation, regardless of funding source.

Rule 4: Any Mitigation Action/Project that might be considered for FEMA mitigation grant funding over the next 5-years covered by this LHMP **MUST** be included in this 2021 LHMP Update.

Rule 5: While the updated Mitigation Strategy should include all potential Mitigation Actions/Projects for each Participating Jurisdiction (regardless of funding source), keep in mind that no one is obligated to implement ANY of the identified Mitigation Actions/Projects – all are always subject to funding and changing priorities.

Rule 6: Each Mitigation Action/Project to be included in this LHMP Update **MUST** have a Mitigation Action Worksheet completed by each Participating Jurisdictions. This applies to Mitigation Actions/Projects being carried forward from the 2016 LHMP.

Rule 7: Participating Jurisdictions **CAN** include Mitigation Actions/Projects that might not get identified during this Mitigation Action/Project Prioritization process – the key is to complete a Mitigation Action Worksheet for any project to be included in the updated LHMP prior to submittal to Cal OES/FEMA.

REMEMBER: Having a FEMA approved LHMP for your Jurisdiction is a prerequisite for being eligible to apply for FEMA pre and post mitigation funding.

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
 - ✓ Subdivision regulations
 - ✓ Building Codes
 - Fire-Wise Construction
 - ✓ Floodplain development regulations
 - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
 - ✓ NOAA Weather Radio
 - ✓ Sirens
 - ✓ “Reverse 911” (Emergency Notification System)
- Emergency Response
 - ✓ Evacuation & Sheltering
 - ✓ Communications
 - ✓ Backup power supply/generators
 - ✓ Emergency Planning
 - Activating the EOC (emergency management)
 - Closing streets or bridges (police or public works)
 - Shutting off power to threatened areas (utility company)
 - Holding/releasing children at school (school district)
 - Ordering an evacuation (mayor)
 - Opening emergency shelters (Red Cross)
 - Monitoring water levels (engineering)
 - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

- ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
- ✓ Lifeline Utilities Protection
- Post-Disaster Mitigation
- Building Inspections
 - ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
 - ✓ Floods
 - Wet/Dry floodproofing (barriers, shields, backflow valves)
 - Relocation/Elevation
 - Acquisition
 - Retrofitting
 - ✓ High Winds/Tornadoes
 - Safe Rooms
 - Securing roofs and foundations with fasteners and tie-downs
 - Strengthening garage doors and other large openings
 - ✓ Winter Storms
 - Immediate snow/ice removal from roofs, tree limbs
 - “Living” snow fences
 - ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
 - Anchoring, bracing, shear walls
 - Dewatering sites, agricultural practices
 - Catch basins
 - ✓ Drought
 - Improve water supply (transport/storage/conservation)
 - Remove moisture competitive plants (Tamarisk/Salt Cedar)
 - Water Restrictions/Water Saver Sprinklers/Appliances
 - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
 - Create incentives to consolidate/connect water services
 - Recycled wastewater on golf courses
 - ✓ Wildfire, Grassfires
 - Replacing building components with fireproof materials
 - Roofing, screening
 - Create “Defensible Space”
 - Installing spark arrestors
 - Fuels Modification

- ✓ Noxious Weeds/Insects
 - Mowing
 - Spraying
 - Replacement planting
 - Stop overgrazing
 - Introduce natural predators

➤ Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices (“BMPs”) are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground’s surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project’s design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

9. Avoidance: setting construction projects back from the stream.
10. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
11. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- Dumping Regulations
- Set-back regulations/buffers

- Fuels Management
- Water Use Restrictions
- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they “stop” flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection:

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Measures from 2016 Placer County LHMP (This is what we are updating)

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Placer County				
Multi-Hazard Actions				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness				
Trail System Way Finding and Directional Signage				
Disaster Debris Management Plan				
Agricultural Actions				
Pest Detection Programs				
Noxious Weed Eradication Programs				
Dam Failure Actions				
Cottonwood Dam Restoration				
Drought Actions				
Retrofit of High Water Use Landscape & Irrigation				
Drought Public Education and Outreach				
Erosion Actions				
Bear Creek Bank Restoration				
Lake Tahoe Basin Environmental Improvement Program (EIP)				
Earthquake Actions				
Fire Station Seismic Upgrade				
Dewitt Demolition				
Health Care Facility Seismic Resiliency				
Flood Actions				
Community Rating System (CRS) Maintain and Enhance				
Stream Channel Clearing – Western Placer County				
Van Norden Dam Lowering and Meadow Restoration				
Miners Ravine Sewer Pipeline Repair				
Sewer System Management Plan Updates				
Stormwater Drainage Improvements				
Bridge and Culvert replacement and drainage improvements				
Urban Level of Flood Protection Mapping				
Elevate Remaining 95 Homes in the Dry Creek Watershed				
Elevate Repetitive Loss Structures in 100-year Floodplain				
Hazardous Material Actions				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Natural Hazard Minimization Evaluation focusing on top 5 facilities in Placer County producing large quantities of hazardous waste/storage of such hazardous materials				
Wildfire Actions				
Large Strategic Fuel Break				
Fuel Breaks in the Wildland Urban Interface (WUI)				
Wildfire Public Education				
Natural Systems Protection / Education and Awareness Programs – Placer County Wildland Urban Interface (WUI) Strategic Planning				
North Fork American River Fuel Break				
Defensible Space Programs				
Project that focus on Open Space/Defensible Space				
Annual Multi-Agency Wildland Fire Drill				
Vegetation Management – Ongoing Maintenance of Fuel Breaks				
City of Auburn				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				
Lincoln Basin (Downtown) Drainage Infrastructure				
Creek and Stream Cleaning and Maintenance Program				
Implementation of Storm Water Treatment Plan				
Electric Street Diversion Project				
Old Town Auburn Storm Drain System				
American River Canyon Shaded Fuel Break				
Community Education on Wildfire				
Residential Home Inspections for Compliance of Fire Safe Standards; Defensible Space.				
Maintenance of the Private Lands Portion of the Shaded Fuel Break Along the Rim of the American River Canyon and the Auburn State Recreation Area (ASRA)				
City of Colfax				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				
Continue Annual Weed Abatement Ordinance				
Colfax Schools Evacuation Site Shaded Fuel Break				
Evaluate the Need and Feasibility of Improving Fire Prevention for the Historic Business District				
City of Lincoln				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Lincoln Boulevard: Auburn Ravine Bridge – Reconstruct Bridge				
McBean Park Drive: Auburn Ravine Bridge – Additional 110' Span				
Lakeview Farms Regional Volumetric Mitigation Facility				
Gladding Parkway, Lincoln Boulevard, McCourtney Road – Stream Restoration And Culvert Improvement				
"O" Street Drainage Improvements				
7th Street Drainage Improvements				
Auburn Ravine at State Route 193 Bridge				
Auburn Ravine at State Route 65 Bridge				
Ingram Slough – Orchard Creek Return Channel				
Markham Ravine – Updated FEMA Analysis And Mapping				
Markham Ravine Drainage Improvements – Union Pacific Railroad & State Route 65 Crossings				
Auburn Ravine Stream Restoration Projects (Analysis and Repairs)				
Auburn Ravine Stream Restoration Projects (Analysis and Repairs)				
Coon Creek Streambed Restoration Projects (Analysis Only)				
Fire Prevention and Fuels Management Plan				
City of Rocklin				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				
Federal Emergency Management Agency (FEMA) Floodplain/Community Rating System (CRS)				
Creek Channel and Drainage Way Clearing and Maintenance				
High Water Use Landscape and Irrigation Retrofit				
Open Space Fire Prevention & Vegetation Management Prescribed Grazing				
GIS Based Mapping of Pertinent Information that can be used by All Agencies in the Development of Plans and During Emergency Incidents				
Town of Loomis				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan				
Local Bridges Evaluation Program				
Address signage for property addresses				
Delmar Avenue Headwall Reconstruction Project				
Creek Maintenance Secret Ravine & Antelope Creek				
Reconstruction of Brace Bridge at Secret Ravine				
Raise Flood-Prone Houses Along Loomis Creeks				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Alta Fire Protection District				
Apparatus Water Fill & Drafting Location Improvements				
Evacuation / Reunification Center Improvements				
Natural Systems Protection / Education and Awareness Programs and Community Fuel Breaks				
Natural Systems Protection / Education and Awareness Programs				
Emergency Communications and Information System Improvements.				
Alta Fire Protection District CERT Team				
Reflective Addressing				
Alpine Springs County Water District				
Emergency Electrical Generator Replacement Project				
Water Storage Tank Replacement Project				
Mineral Springs Soil Bank Stabilization Project				
Alpine Meadows Consolidated Defensible Space Continuation Project				
Foresthills Fire Protection District				
Completion of Fuels Management Projects within the Foresthill/Iowa Hill Fire Safe Council, Greater Auburn Area Fire Safe Council and Placer Sierra Fire Safe Council Areas of the Western Slope of Placer County.				
Foresthill Biomass Project				
Assess and Enhance Foresthill Fire Protection District (FFPD) New Subdivision, Hazard Fuels Clearing and Maintenance Ordinance. Put Programs in Place with Homeowners Associations in CC&R's and Maintenance Contracts.				
Todd Valley Shaded Fuel Break				
Completion of Fuels Management Projects within the Foresthill/Iowa Hill Fire Safe Council, Greater Auburn Area Fire Safe Council and Placer Sierra Fire Safe Council Areas of the Western Slope of Placer County.				
Loomis Fire Protection District				
Identify and inspect ALL bridges in LFPD				
Vegetation Management for Open Areas				
Address Signs for Rural Residences				
Adopt 2016 CFC, CBC, and local standards				
Nevada Irrigation District				
Combie Phase 1 Replacement				
Centennial Water Storage and Power Supply Project				
Water Service Auburn Valley CSD				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
NID Headquarters Office Generator				
Orr Creek Diversion				
Reservoir Cleaning				
Canal Culvert Replacement Program				
Northstar Community Services District				
Martis Landing Drainage Swales and Catch Basins				
Continue Easement Access Road Water Bar Maintenance and Replacement Program				
Fuels Reduction @ Sawmill Reservoir				
Fuels Reduction Program				
Storm Water Drainage Inlet Maintenance				
Siphon Line				
Provide Power from Mobile Generator				
Green Waste Recycling Program				
Enhance our current Defensible Space Program by seeking funding to hire a part-time employee to assist the Fire Prevention department in running this program				
District Water Conservation Program				
North Tahoe Fire Protection District				
FCC P-25 Interoperability Radio Systems				
District GIS Technology, Equipment, Database and Mapping Improvements				
North Tahoe Fire Protection District Critical Facility Infrastructure Improvements				
Seiche Wave Warning Systems, Signs and Public Education				
Defensible Space Inspection, Tree Marking, Chipping Program, and Public Education				
Hazardous Wood Roof Replacement Program				
Regional Water System Fire Protection Upgrades and Interoperability				
Skid Steer Loader with Transport Trailer, Fuels Reduction Masticator Attachment and Snow Blower Attachment				
Hydrant Risers, Replacements and Markers				
North Tahoe Public Utility District				
Update SCADA Equipment and Telecommunications Infrastructure				
IT and Telecommunications Improvements for Disaster Preparedness				
Update Emergency Response Plan				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Backup Generator Installation at Critical Facilities				
Fuels Reduction around Critical Infrastructure and North Tahoe Regional Park				
Kingswood West Subdivision Emergency Evacuation Access				
North Tahoe Regional Park Road Improvements for Emergency Access				
Seismic Study and Retrofit of Critical Infrastructure				
Sewer Main Replacements in Shorezone of Lake Tahoe				
Water Booster Pump Station Rehabilitation/Replacement				
Increased Storage Capacity for Dollar Cove Water System				
Water System Interties				
Placer County Flood Control District				
FEMA CTP DFIRM Mapping Study				
Pursue Regional Detention and Retention Projects within the Dry Creek and Cross Canal Watersheds				
Update Hydrology and Hydraulic Models within the Cross Canal Watershed				
Upgrade of Flood Warning System to Include Additional Gage Locations and Flood Forecasting Capabilities				
Placer County Water Agency				
Hillside Slope Stabilization				
LL Anderson Dam Spill Way Modification				
Water System Interties				
Vegetation Management and Brushing				
Enhance Canals by Converting Earthen Canals to Gunite-Lined Canals in Critical Areas				
Replace Wooden Flume Structures				
De-Silt Reservoirs.				
Placer Hills Fire Protection District				
Assess And Enhance Placer Hills Fire Protection District (PHFPD) Onsite Water Requirements For Minor Lot Splits				
South Placer Fire Protection District				
Vegetation Management for Open Areas				
Address Signs for Rural Residences				
Adopt 2016 CFC, CBC, and local standards				
Squaw Valley Public Service District				
Emergency Water Supply Interconnection to Martis Valley				
Truckee River Siphon				

Action Title	Complete	Ongoing	Not Yet Started	In 2021 Plan Update
Squaw Creek Siphon				
Easement Abatement/Maintenance of Emergency Access				
Develop a Community-Wide Emergency Notification System Capable of Providing Information to Both Residents and Visitors by Utilizing Permanent, Roadside Changeable Message Boards and a Low-Power Radio Transmitter				
SVPSD/Mutual Water Company Inter-tie				
Water Tank Earthquake Retrofit Project				
Tahoe City Public Utility District				
Bunker Water Tank Replacement				
West Lake Tahoe Regional Water Treatment Plant				
Tahoe Main Emergency Water Supply				
Tahoe Truckee Unified School District				
North Tahoe High School and Middle School, Tahoe Lake Elementary School Emergency Generators.				
School Site and Community Education of Procedures Related to Safety and Emergency Situations. Improvement of District Wide Emergency Communication and Alert Systems.				
HVAC Control Upgrades				
Truckee Fire Protection District				
Community Wildfire Protection Plan				
Severe Winter Weather and Propane Issues Mainly in Serene Lakes				

Mitigation Strategy: Action (Implementation) Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect ...
 - ✓ The largest # of people exposed to risk?
 - ✓ The largest # of buildings?
 - ✓ The largest # of jobs?
 - ✓ The largest tax income?
 - ✓ The largest average annual loss potential?
 - ✓ The area impacted most frequently?

- ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization (Voting) Instructions

The mitigation actions and projects will be further collated by hazard and will be presented back to the HMPC for prioritization. **An email link to the voting site will be launched Friday March 5th; voting will be open for a week and will close Friday March 12th.** The voting website location is <https://fostermorrison.aweeba.com/>.

Each person will have 9 votes total to vote for their preferred mitigation actions/projects:

- *3 high priority votes (5 points each)*
- *3 medium priority votes (3 points each)*
- *3 low priority votes (1 point each)*

Your votes will indicate the consensus of the team.

Use the list of mitigation selection criteria (above) to help you make your determinations.

After the votes are tabulated, we will send out an email detailing mitigation action prioritization results and next steps.

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

C.2 Mitigation Strategy Meetings – Action Prioritization

Placer County 2021 LHMP Update

Mitigation Strategy Meetings – Action Prioritization

50 Voting Members

Actions sorted by Vote Totals

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Backup power supply for critical facilities and infrastructure/Generator projects	Multi-Hazard	37
Community Wildfire Protection Plans (CWPP) – Implementation of Projects	Wildfire/Tree Mortality	36
Fire Prevention and Fuels Management Plan	Wildfire/Tree Mortality	35
Continue to implement, and update as necessary, the Strategic Plan for Placer County Wildfire Protection and Biomass Utilization Program to seek ways to reduce the efforts of catastrophic wildfires, and convert unwanted woody biomass to produce heat and/or electrical power, alternative transportation fuels, or beneficial bio-based chemicals and products.	Wildfire/Tree Mortality	30
Critical Facility Infrastructure Improvements	Multi-Hazard	30
Fuel reduction projects	Wildfire/Tree Mortality	29
Open Space fire prevention & vegetation management prescribed grazing	Wildfire/Tree Mortality	29
Defensible space inspection, tree marking, chipping program and public education	Wildfire/Tree Mortality	27
Expand the county's capacity to restore conifer forest health on private and public lands, which includes active management to reduce fire risk, including removal and disposal of diseased trees and other fuels. Work with public and private partners to identify appropriate locations for mills, biomass facilities, or other facilities that support the reuse of trees for other uses, including composting and renewable energy.	Wildfire/Tree Mortality	26
Implement the actions contained within the Placer County Climate Adaptation Plan	Climate Change	24
Work with telecommunication companies to install fiber-optic infrastructure allowing for faster and higher-capacity broadband internet, including telecommunication systems that can be used to more effectively distribute emergency communications and alerts to members of the public	Multi-Hazard	24
Construct additional water storage facilities and improve existing facilities to augment surface and groundwater supplies for agricultural uses while continuing to provide ecosystem protections	Agricultural Hazard/Drought	22
Implement the actions contained within the Placer County Sustainability Plan	Climate Change	21

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Chipper program	Wildfire/Tree Mortality	21
Vegetation management – Ongoing maintenance of fuel breaks	Wildfire/Tree Mortality	21
Water source redundancy and reliability projects	Drought and Water Shortage	20
McBean Park Drive: Auburn Ravine bridge – additional 110' Span	Flood	20
Lakeview Farms regional volumetric mitigation facility	Flood	20
Water system intertie projects and connections	Drought and Water Shortage	19
Defensible space program	Wildfire/Tree Mortality	19
Establish a Biomass Facility – fixed/portable	Wildfire/Tree Mortality	19
Expand broadband/wifi access	Multi-Hazard	18
Develop an Avalanche Risk Reduction and Response Plan (multi-agency) for Placer County	Avalanche	17
Establish emergency water supply interconnections	Drought and Water Shortage	17
Implement organics waster (food and green waste) reduction/recycling programs to reduce emissions from the decomposition of organic waste in the landfill (organics creates methane, which contributes to climate change; Cal Recycle requires 75% reduction by 2025)	Climate Change	16
Vegetation management projects	Wildfire/Tree Mortality	16
Enhance public education and awareness of natural hazards and public understanding of disaster preparedness	Multi-Hazard	16
Increase broadband systems and access	Pandemic	15
Continue to support new FireWise communities/conduct FireWise community inspections	Wildfire/Tree Mortality	15
Explore creating wildfire abatement districts to provide fuel-clearing services and maintenance of defensible space on public and private land within the county.	Wildfire/Tree Mortality	15
Drainage improvement projects	Flood	14
Large strategic fuel breaks, including those in the Wildland Urban Interface (WUI) areas	Wildfire/Tree Mortality	14
Evacuation planning countywide	Multi-Hazard	14
Noxious weed eradication programs	Agricultural Hazard	13
Ensure that County facilities used as cooling centers are equipped with backup power supplies, including on-site renewable energy generation and energy storage systems as feasible	Severe Weather: Heat	13

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Home hardening projects	Wildfire/Tree Mortality	13
Pest detection programs	Agricultural Hazard	12
Enhance programs and improve capabilities/efficiency to receive/recycle green waste	Climate Change	12
FEMA CTP DFIRM mapping study	Flood	12
Undergrounding of utilities	Severe Weather: All	12
Improve water systems for suppression and resiliency against wildfires	Wildfire/Tree Mortality	12
Identify/support new or expanded fuel reduction projects, including those that provide assistance for biomass facilities.	Wildfire/Tree Mortality	12
Work with stakeholders to develop a pilot project on private or public land that demonstrates the cost-savings of treating and managing land for wildfire prevention in relation to air quality and other ecosystem services. The project could consider both direct (i.e. homes and roadways) and indirect costs (i.e. social capital and air quality), the costs of management and prevention compared to the costs of no action and recovery, and the emission reduction potential of good forest management to the extent possible.	Wildfire/Tree Mortality	11
GIS based mapping of pertinent information that can be used by all agencies in the development of plans and during emergency incidents	Multi-Hazard	11
Increase soil organic matter to improve soils' water-holding capacity, soil structure, and water infiltration, and to reduce erosion (use cover crops and mixes, native grasses, crop or livestock residues, compost, mulch, biochar, or other organic amendments)	Drought and Water Shortage	10
Lincoln Boulevard: Auburn Ravine bridge – reconstruct bridge	Flood	10
Auburn Ravine stream restoration projects	Flood	10
Wildfire smoke impact response – education and outreach	Wildfire/Tree Mortality	10
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Multi-Hazard	10
Interoperability radio systems	Multi-Hazard	10
Develop Climate Adaptation Plan	Climate Change	9
Sedimentation removal from reservoirs	Dam Failure	9
Floodproofing utilities and critical facilities and infrastructure	Flood	9
Repair and replace lift stations	Flood	9
Prescribed burns	Wildfire/Tree Mortality	9
Fuel reduction for previously burned areas	Wildfire/Tree Mortality	9
Explore the feasibility of installing a microgrid at the Placer County Government Center for backup power and evaluate the feasibility of microgrids in Tahoe or Foresthill to provide emergency response and economic resiliency.	Multi-Hazard	9

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Conduct seismic evaluation and retrofits of public buildings and critical facilities and infrastructure	Earthquake	8
Stream and creek channel and drainage way clearing and maintenance projects	Flood	8
Natural Systems Protection / Education and Awareness Programs – Placer County Wildland Urban Interface (WUI) Strategic Planning	Wildfire/Tree Mortality	7
Install piezometers in earthen dams	Dam Failure/ Earthquake	6
Increase the use of permeable surfaces and rainwater catchment/retention systems in developed areas to enhance groundwater recharge	Drought and Water Shortage	6
Support the West Placer Groundwater Sustainability Agency's efforts to develop a Groundwater Sustainability Plan in accordance with state regulations	Drought and Water Shortage	6
Water tank earthquake retrofit project	Earthquake	6
Bridge and culvert replacement projects	Flood	6
Auburn Ravine at State Route 193 Bridge	Flood	6
Upgrade of flood warning systems to include additional gage locations and flood forecasting capabilities	Flood	6
Update hydrology and hydraulic models within the Cross Canal Watershed	Flood	6
Conduct avalanche mitigation in high risk areas	Avalanche	5
Foresthill Transfer Station – Increase the amount of tipping bays for green waste to improve efficiency.	Climate Change	5
Explore ways to improve the storage capacity and generation efficiency at PCWA/County hydroelectric power plants and to increase installation of small-scale hydroelectric facilities. Identify areas appropriate for small-scale hydroelectric facilities	Climate Change	5
Spillway projects to control the flow of water	Dam Failure	5
Water booster pump station rehabilitation/replacement	Drought and Water Shortage	5
Installation of SCADA systems	Flood	5
Pursue regional detention and retention projects within the Dry Creek and Cross Canal Watershed	Flood	5
Conduct structural retrofits of at-risk bridges to protect against flooding and landslides/debris flows. Emphasize bridges with lower stability ratings and higher traffic counts. E.g., Edgewood Road over Wise Canal and Dry Creek Road over Rock Creek	Flood/Landslide	5
Develop a communitywide emergency notification system capable of providing information to both residents and visitors by utilizing permanent, roadside changeable message boards and a low power transmitter	Multi-Hazard	5
IT and telecommunications improvements for disaster preparedness	Multi-Hazard	5
In coordination with utility companies, explore replacing streetlights with new models, or augmenting existing streetlights with additional features, allowing them to act as public Wi-Fi beacons, traffic counters, and relay stations for public emergency alerts. Prioritize development of smart street lights in the Tahoe Basin	Multi-Hazard	5

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Update the Emergency Operations Plan to include dam failure events	Dam Failure	4
Groundwater recharge projects	Drought and Water Shortage	4
Squaw Creek siphon	Drought and Water Shortage	4
Increased Storage Capacity for Dollar Cove Water System	Drought and Water Shortage	4
Elevate remaining 95 homes in the Dry Creek Watershed	Flood	4
Enhance/continue weed abatement ordinance/hazardous vegetation ordinance	Wildfire/Tree Mortality	4
Hydrant risers, replacements, and markers	Wildfire/Tree Mortality	4
GIS technology, equipment, database, and mapping improvements	Multi-Hazard	4
Local air quality sensors to provide instantaneous public information on local PM concentrations due to wildfire smoke	Multi-Hazard	4
Conduct ongoing public outreach about water conservation programs throughout Placer County	Drought and Water Shortage	3
Canal culvert replacement program	Flood	3
Ensure that wastewater infrastructure in flood-prone areas is hardened to minimize the risk of overflow	Flood	3
Erosion repair and control projects	Flood	3
Best Management Practices (BMP) implementation	Flood	3
Coon Creek streambed restoration projects	Flood	3
Urban level of flood protection mapping	Flood	3
Stormwater drainage inlet maintenance	Flood	3
Increase resiliency of single-access roads and trails (particularly popular trails and those that could provide access to isolated communities if the primary road is damaged or inaccessible) to flooding by improving drainage systems, increasing roadbed height, and other protective steps as feasible and appropriate	Flood	3
North Fork American River fuel break	Wildfire/Tree Mortality	3
Establish underground waterlines for delivery to fire hydrants	Wildfire/Tree Mortality	3
Improve access to canals and ditches by emergency vehicles to access water for fire fighting	Wildfire/Tree Mortality	3
Replace wooden flume structures	Wildfire/Tree Mortality	3
Coordinate with the California Department of Housing and Community Development, mobile home park owners, and mobile home tenants in wildfire hazard zones to reduce fuel availability and maximize defensible space.	Wildfire/Tree Mortality	3
New flood/hydrology related studies should factor climate change into models to accommodate future floods events	Climate Change	2

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Provide education and outreach on organic waste and GHG emissions	Climate Change	1
Increase access to organics recycling and edible food recovery capacity	Climate Change	1
Sewer main replacements in Shorezone of Lake Tahoe	Drought and Water Shortage	1
Elevate repetitive loss structures in 100-year floodplain	Flood	1
Relocation of 36" sewer line that crosses the Truckee River below Lake Tahoe. (The river water level reaches this pipe at a release of 2000 cfs from Lake Tahoe)	Flood	1
Auburn Ravine at State Route 65 Bridge	Flood	1
HVAC system upgrades	Pandemic	1
Place warning signage in key areas around Lake Tahoe	Seiche	1
Using cool roofing products that reflect sunlight and heat away from buildings	Severe Weather: Heat	1
Regional water system fire protection upgrades and interoperability	Wildfire/Tree Mortality	1
Work with dam owners to maintain all dams in Placer County to a high degree of structural integrity	Dam Failure/ Earthquake	0
Enhance canals by converting earthen canals to gunite-lined canals in critical areas	Drought and Water Shortage	0
Develop a rebate program for greywater and rainwater catchment systems	Drought and Water Shortage	0
West Lake Tahoe regional water treatment plant	Drought and Water Shortage	0
Community Rating System (CRS) - maintain and enhance	Flood	0
Develop/update/implement stormwater master plans	Flood	0
Raise/relocate utilities out of the floodplain/above base flood elevation	Flood	0
Elevate roads above base flood elevation to maintain dry access	Flood	0
Gladding Parkway, Lincoln Boulevard, McCourtney Road – Stream restoration and culvert improvement	Flood	0
"O" Street drainage improvements	Flood	0
7th Street drainage improvements	Flood	0
Ingram Slough – Orchard Creek return channel	Flood	0
Markham Ravine – Updated FEMA analysis and mapping	Flood	0
Markham Ravine drainage improvements – Union Pacific Railroad & State Route 65 crossings	Flood	0
Conduct regular cleaning and maintenance of storm drains along key roadways, especially in advance of the rainy season. Improve storm drain capacity in areas where ponding is regularly observed	Flood	0
Siphon lines	Flood	0
Annually distribute flood protection safety pamphlets to educate citizens about safety during flood conditions, including the dangers of driving on flooded roads	Flood	0

Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
Hillside Slope Stabilization	Flood/Landslide	0
Install warning/siren system	Seiche	0
Severe Weather Annex update and revision	Severe Weather: All	0
Increase tree plantings around buildings to shade parking lots and along public rights-of-way	Severe Weather: Heat	0
Fuel reduction around critical infrastructure and North Tahoe Regional Park	Wildfire/Tree Mortality	0
Shaded fuel break along west shore of Folsom Lake – Granite Bay	Wildfire/Tree Mortality	0
Evaluate the need and feasibility of improving fire prevention for the historic business districts	Wildfire/Tree Mortality	0
Acquire skid steer loader with transport trailer, fuels reduction masticator/snow blower attachment	Wildfire/Tree Mortality	0
Easement abatement/maintenance of emergency access areas	Wildfire/Tree Mortality	0
North Tahoe Regional Park road improvements for emergency access	Multi-Hazard	0

C.3 Categories of Mitigation Measures Considered

The following categories of mitigation measures are based on the Community Rating System.

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information

C.4 Placer County Analysis of Alternative Mitigation Measures per Category

Note: This review of mitigation measures is in compliance with the FEMA's nationally accepted six mitigation categories and FEMA's CRS Program requirement to provide a comprehensive evaluation of the six mitigation categories with a specific requirement that Preventative Measures be thoroughly reviewed. This review leads to the projects incorporated into the mitigation strategy action plan.

C.4.1. Preventive Measures

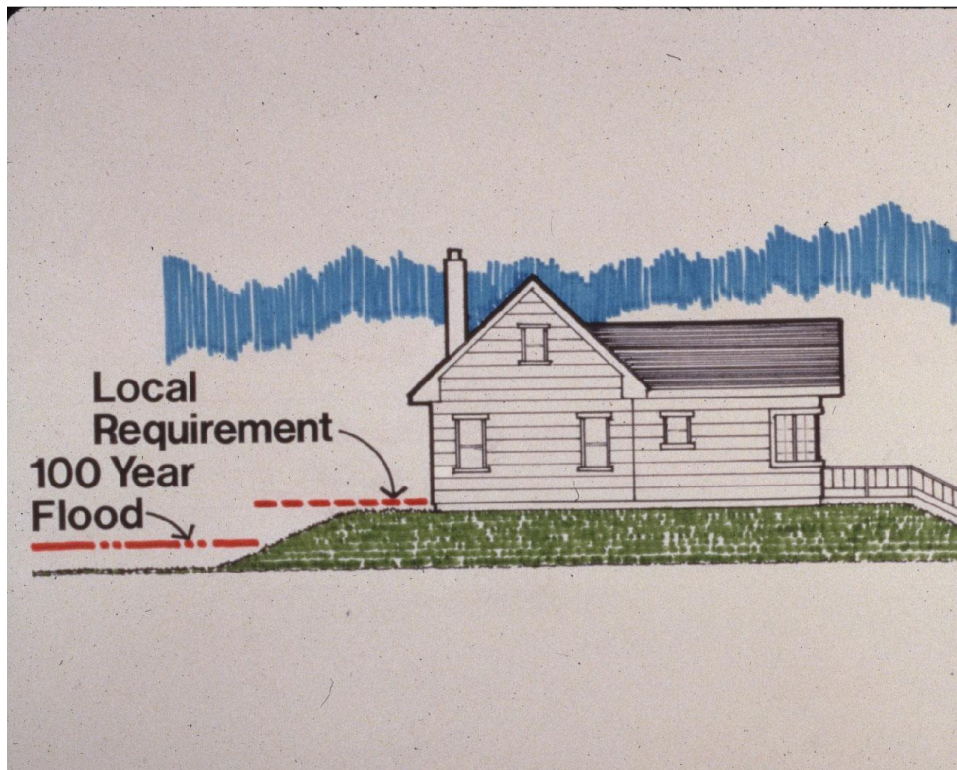
Preventive measures are designed to keep a problem - such as flooding - from occurring or from getting worse. The objective of preventive measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventive measures. Some examples of types of preventive measures include:

- Building codes and floodplain regulations
- Comprehensive land use planning, zoning, and open space preservation
- Stormwater management and subdivision regulations

Building Codes

Building codes provide one of the best methods of addressing natural hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). This is shown in Figure 0-1.

Figure 0-1 Building Codes and Flood Elevations



Floodplain Regulations

Most communities with a flood problem participate in the National Flood Insurance Program (NFIP). The NFIP sets minimum requirements for the participating communities' standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings. These are usually spelled out in a separate ordinance.

The NFIP minimum requirements are summarized below. It should be stressed that these are minimum requirements. Local conditions, such as high velocity flooding or the presence of a potential dam failure, may warrant higher local standards.

Enforcement

To ensure that communities are meeting the NFIP standards, FEMA periodically conducts a Community Assessment Visit. During this visit, the maps and ordinances are reviewed, permits are checked, and issues are discussed with staff. Failure to meet all of the requirements can result in one or more consequences:

- Reclassification under the Community Rating System to a higher class
- Probation, which entails a \$50 surcharge on every flood insurance policy in the community, or
- Suspension from the NFIP.

Suspension is the most serious. It means that the community is out of the NFIP and the following sanctions are imposed:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- Existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies, such as HUD, EPA, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe for any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

One way to assure good administration and enforcement is to have Certified Floodplain Managers on staff. The Association of State Floodplain Managers administers the national Certified Floodplain Manager (CFM®) program.

Minimum National Flood Insurance Program Regulatory Requirements

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA). As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood. The floodplain subject to these requirements is shown as an A or V Zone on the Flood Insurance Rate Map (FIRM).

There are five major floodplain regulatory requirements. Additional floodplain regulatory requirements may be set by state and local laws.

1. All development in the 100-year floodplain must have a permit from the community. The NFIP regulations define "development" as any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.
2. Development along a river or other channel cannot obstruct flows so as to cause an increase in flooding on other properties. An analysis must be conducted to demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
3. New buildings may be built in the floodplain, but they must be protected from damage from the base flood. In riverine floodplains, the lowest floor of residential buildings must be elevated to be at or above the base flood elevation (BFE). Nonresidential buildings must be either elevated or floodproofed.

4. Under the NFIP, a "substantially improved" building is treated as a new building. The NFIP regulations define "substantial improvement" as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This requirement also applies to buildings that are substantially damaged.
5. Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the federal criteria. The NFIP's Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.

Local Implementation

Placer County has adopted the 2019 California Building Code based on the 2018 International Building Code. Placer County has Floodplain Damage Prevention Regulations that exceed minimum NFIP standards and implement floodplain regulations that include some higher regulatory standards.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step.

Reduce Future Flood Losses

Future flood losses should be reduced by enforcement of current floodplain regulations. For new residential construction and substantial improvement, Placer County requires that the lowest floor be elevated a minimum of one foot above the base flood elevation. It is recommended that the finish floor be a minimum of two feet above the base flood elevation in order to prevent inundation of floor joists, insulation and other appurtenant components located on the underside of the finish floor. Non residential construction shall either be elevated to conform to the residential standard or be floodproofed so that below the base flood level the structure is watertight, "with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy." This reduces future flood losses by keeping development out of known floodplains. This is done by enacting and enforcing the current standards and/or adopting higher regulatory standards.

Current Standards

As mentioned above, Placer County has Flood Damage Prevention Regulations that meet all of the NFIP's minimum floodplain regulatory requirements and exceed some of them such as establishing one foot of freeboard. Their regulations include methods and provisions for:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increase in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

In addition, all new construction or substantial improvements shall be:

- Designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
- Constructed in ways that minimize flood damage
- Constructed with materials resistant to flood damage
- Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities designed or located so as to prevent water from entering or accumulating within components during flooding

Placer County also requires that:

- All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from systems into floodwaters.
- On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

Placer County also has regulations that exceed minimum NFIP standards. These include:

- Floodways are delineated and certain requirements apply to construction within these floodways so as to not result in any increase in flood levels during the occurrence of the base flood discharge.
- Requiring new construction and substantial improvements to have the lowest flood, including basement, elevated a minimum of one foot above the base flood elevation.
- All building permit applicants who may be located in Flood Zone A must have a California registered engineer prepare an engineering study including an evaluation of the building site, determination as to whether the structure will be located in a 100-year flood zone and supporting flood data.
- Restrictions and standards are included on the use of enclosures below elevated buildings.

In addition, Placer County's floodplain management program is implemented by Certified Floodplain Managers on staff with the County's Department of Public Works Stormwater and Floodplain Programs.

Manufactured Homes

Manufactured or mobile homes are usually not regulated by local building codes. They are built in a factory in another state and are shipped to a site. They do have to meet construction standards set by the U.S. Department of Housing and Urban Development. All mobile homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location of these structures and their on-site installation.

Local Implementation

Placer County requires that all manufactured homes that are placed or substantially improved within a special flood hazard area on the community's Flood Insurance Rate Map: (1) outside of a manufactured home park or subdivision, (2) in a new manufactured home park or subdivision, (3) in an expansion to an existing manufactured home park or subdivision, (4) in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as the result of a flood: will be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to a minimum

of one foot above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation collapse and lateral movement. All manufactured homes to be placed or substantially improved on sites in an existing manufactured home park or subdivision on the community's Flood Insurance Rate Map that are not subject to the provisions of subsection A of this section will be elevated so that either: 1) The lowest floor of the manufactured home is a minimum of one foot above the base flood elevation; or 2) The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than thirty-six (36) inches in height above grade and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

CRS Credit

Building Codes: The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. Placer County's BCEGS rating is a Class 2 for both residential and commercial. Placer County uses the 2019 California Building Code.

The CRS also has a prerequisite for a community to attain a Class 6 or better within the CRS program, the community must have a BCEGS class of 5/5 or better. To attain a Class 4 or better in the CRS program, the community must have a BCEGS class of 4/4 or better. Placer County has a BCEGS classification of 2/2. Placer County has also adopted the 2018 International Code series.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System in the NFIP.

- The CRS recognizes 18 creditable activities, organized under four categories numbered 300 through 600:
 - ✓ Public Information
 - ✓ Mapping and Regulations
 - ✓ Flood Damage Reduction
 - ✓ Flood Preparedness
- Placer County participates in the Community Rating System (CRS) of the National Flood Insurance Program.
- By implementing these floodplain management activities, the residents of Placer County can qualify for a flood insurance premium rate reduction. When communities go beyond the minimum standards for floodplain management, the CRS can provide discounts up to 45% off flood insurance premiums.

The County of Placer is currently a Class 5 community, which provides a 25% discount on flood insurance to properties located in the Special Flood Hazard Area.

Floodplain management regulations: There are many higher regulatory standards that warrant CRS credit. These standards include:

- Delineating a floodway, the area of higher hazard near the channel. This would allow development outside the floodway (called the "floodplain fringe") without engineering studies to determine their impact on others.

- Requiring all new construction to be elevated one or two feet above the base flood elevation to provide an extra level of protection from waves and higher floods. This extra protection is reflected in a distinct reduction in flood insurance rates.
- Having all developers (not just the larger ones) provide flood data where none are available.
- Specifications to protect foundations from erosion, scour and settling.
- Prohibiting critical facilities from all or parts of the floodplain.
- Prohibiting hazardous materials.
- Requiring buffers adjacent to streams or natural areas.
- Restrictions on use of enclosures below elevated buildings.
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage.
- The CRS also provides credit for having trained staff and a higher credit if the staff members are Certified Floodplain Managers.

It should be noted that one of the prerequisites for participation in the CRS is that the community be in full compliance with the minimum requirements of the NFIP. A community with a number of "potential violations" risks being removed from the CRS entirely.

Manufactured homes: The NFIP allows communities to exempt mobile homes in existing mobile home parks from some of the flood protection requirements. The CRS provides up to 50 points if the community does not use this exemption.

Comprehensive Land Use Planning, Zoning, and Open Space Preservation

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, particularly floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of land that is prone to flooding, such as open space or recreation. Planning and zoning activities can also provide benefits by simply allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

General and Comprehensive Plans

These plans are the primary tools used by communities to address future development. They can reduce future flood-related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

Generally, a plan has limited authority. It reflects what the community would like to see happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

Capital Improvement Plans

A capital improvement plan can guide a community's major public expenditures for a 5- to 20-year period. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

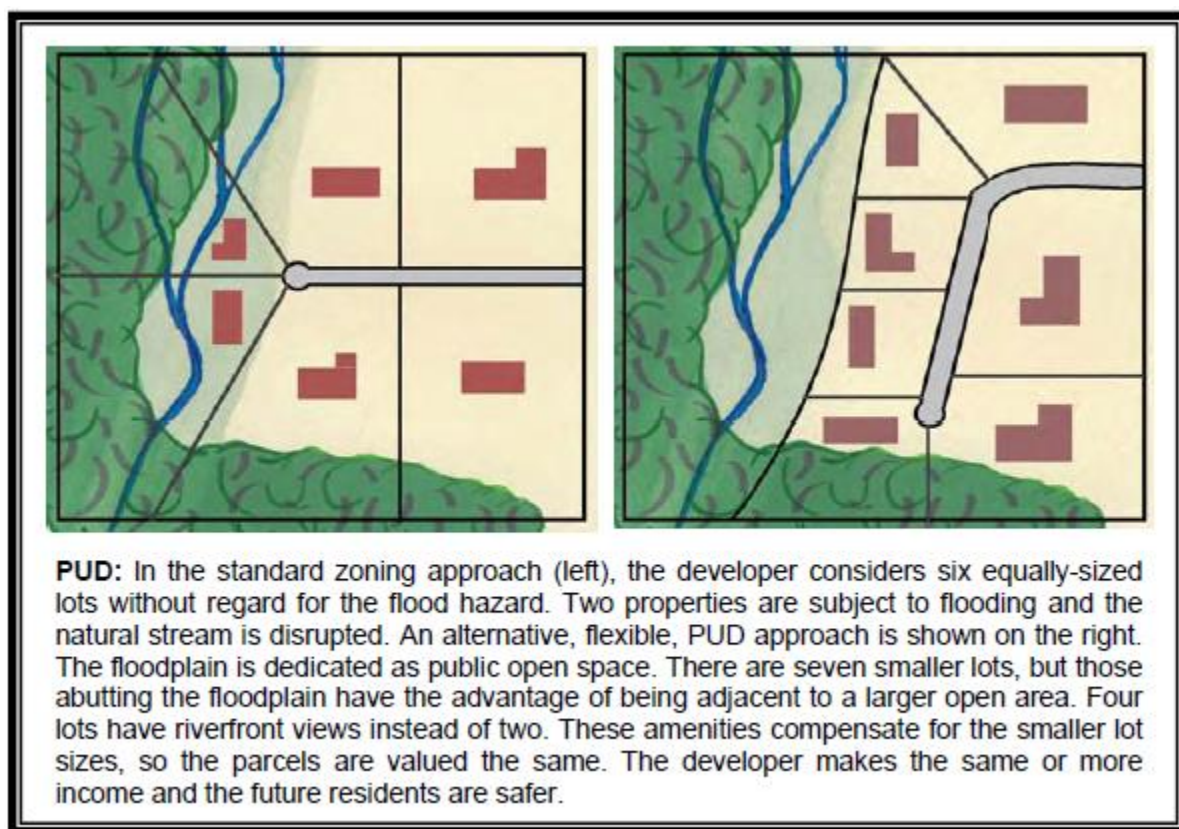
Zoning

A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each of those zones or districts. Zoning codes are considered the primary tool to implement a general/comprehensive plan's guidelines for how land should be developed.

Zoning ordinances can limit development in hazardous areas, such as reserving floodplain zones for agricultural uses. Often, developers will produce a standard grid layout. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use the planned unit development (PUD) approach or cluster development. The PUD and cluster approach's allows the developer to easily incorporate flood hazard mitigation measures into the project. Open space or floodplain preservation can be facilitated as site design standards and land use densities can be adjusted to fit the property's specific characteristics, as shown in Figure 0-2.

Figure 0-2 Zoning for Development in the Floodzone



Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

Local Implementation

General Plan: On May 21, 2013, Placer County adopted their new General Plan. As part of the 2013 General Plan update, the County revised the standards pertaining to new flood protection requirements. This included changes to the Safety Element and other areas of the General Plan and includes the introduction of the term “County Regulatory Floodplains” that includes both the 100-year FEMA floodplain and the 200-year floodplain. No update to the flood damage prevention ordinance is required since current regulations already regulate projects in the regulatory floodplain. Under this program the County is also considering the 200-year storm when reviewing projects.

Zoning and Open Space Preservation: Placer County’s General Plan, in coordination with the local Codes, protects current open space. In addition, the General Plan includes a statement:

The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space to the maximum extent feasible. The County shall permanently protect, as open space, areas of natural resource value, including wetlands, riparian corridors, unfragmented woodlands, and floodplains.

Reduce Future Flood Losses

Enacting the General Plans and the comprehensive zoning and future land uses contained in the County General Plan will help to reduce future flood losses by helping to keep development out of hazardous areas and known floodplains.

Current Standards

Placer County’s zoning codes do not provide for any additional restrictions on development in floodplains, aside from what is required under each jurisdiction’s floodplain regulations regarding building standards for floodplains.

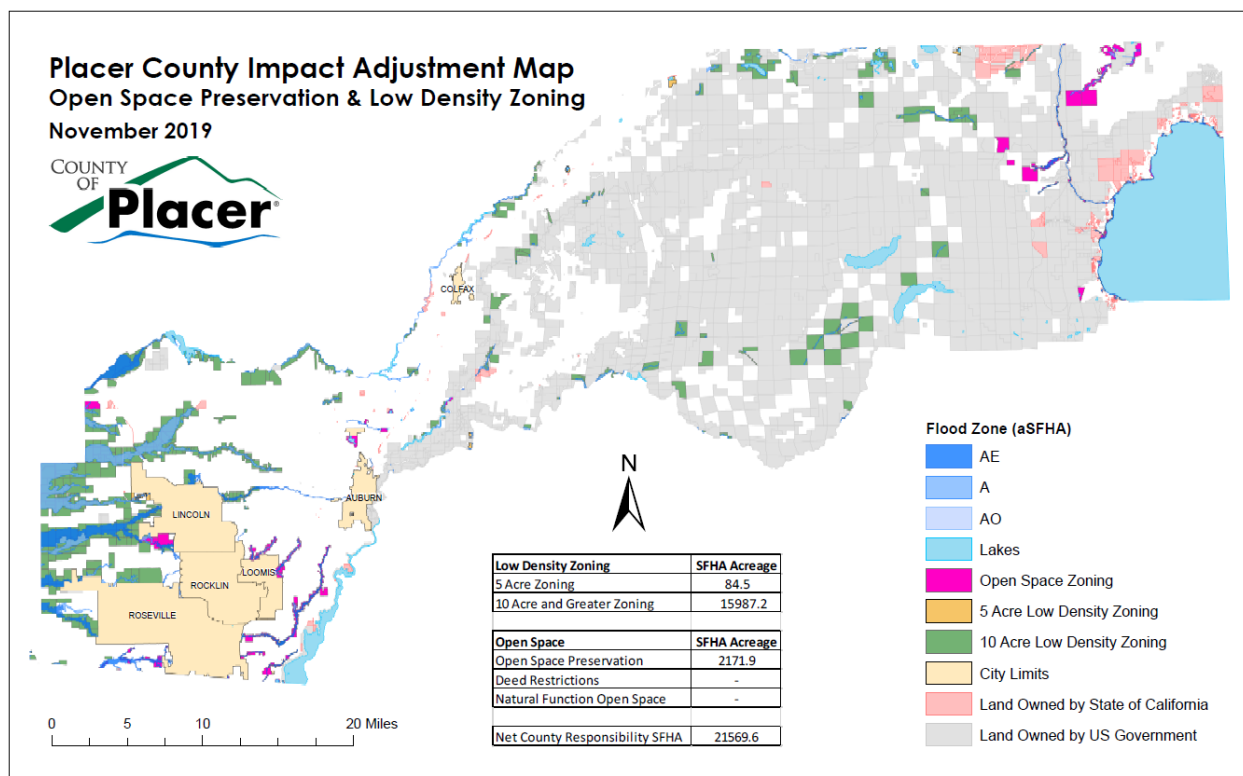
CRS Credit

The CRS provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

Credits are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Credits are also provided for setting aside floodplains for low density zoning, such as five acre lots or conservation. The County has placed zoning requirements within floodplain areas that are for low density development, open space and deed restrictions.

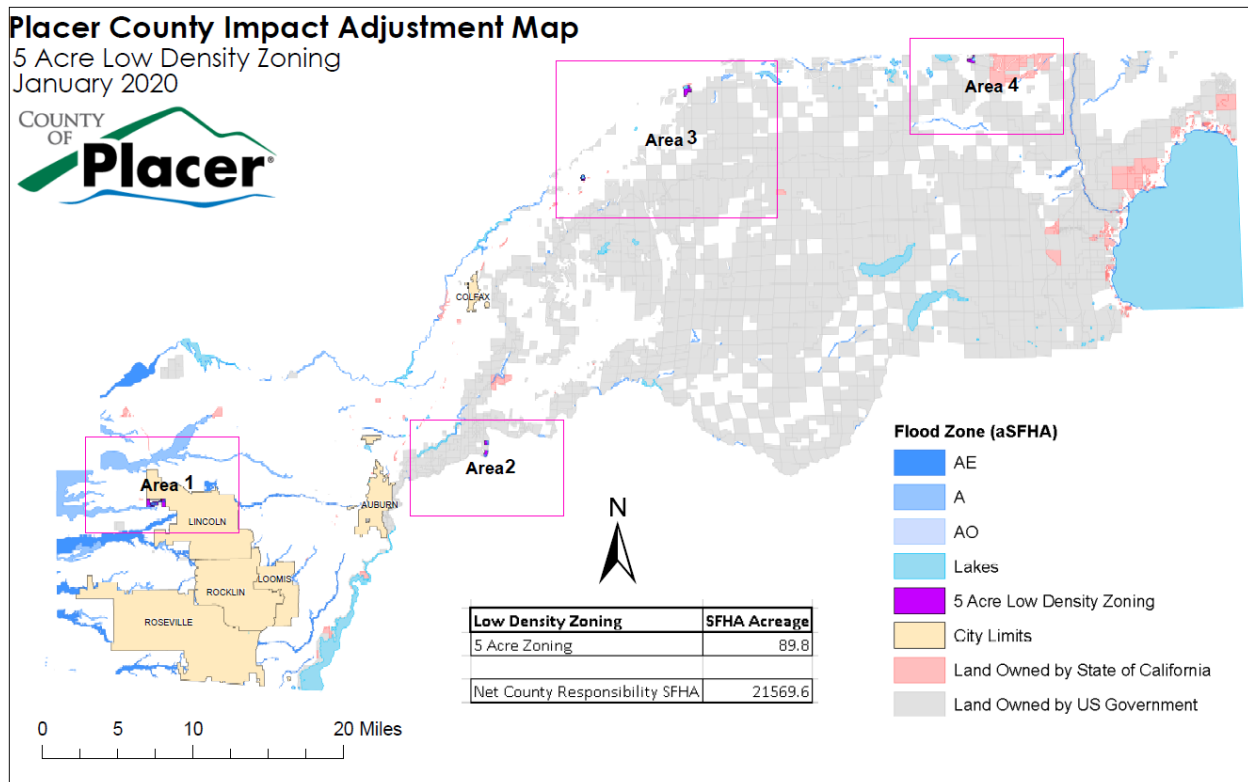
Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 1,450 points can be given, based on how much of the floodplain is in community public undeveloped properties, parks, wildlife refuges, golf courses, or other uses that can be depended on to stay open (Activity 420 - Open Space Preservation). Placer County has over 2000 acres designated as open space zoning within the SFHA. See Figure 0-3 for these areas. Figures C-5 and C-6 show additional information for areas of low density zoning.

Figure 0-3 Placer County Impact Adjustment



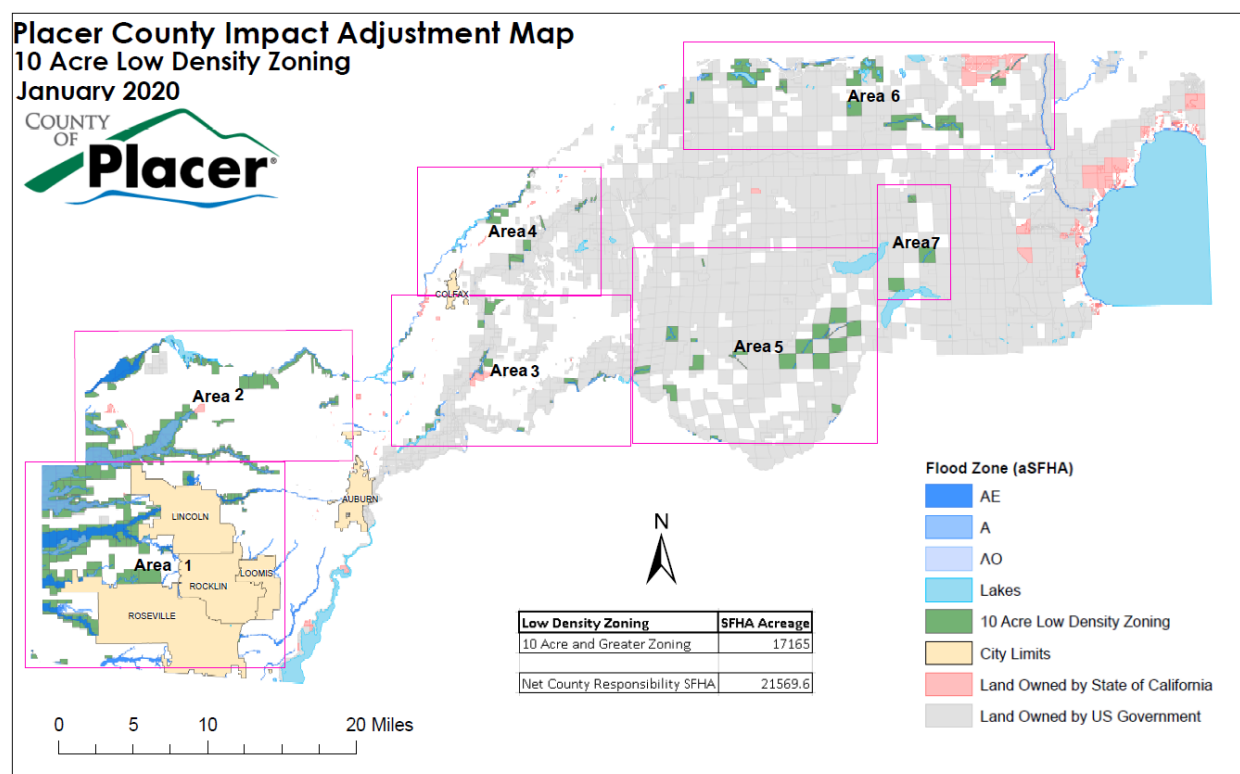
Source: Placer County

Figure 0-5 Placer County Impact Adjustment – 5- Acre Overall Map



Source: Placer County

Figure 0-6 Placer County Impact Adjustment – 10 Acre Overall Map



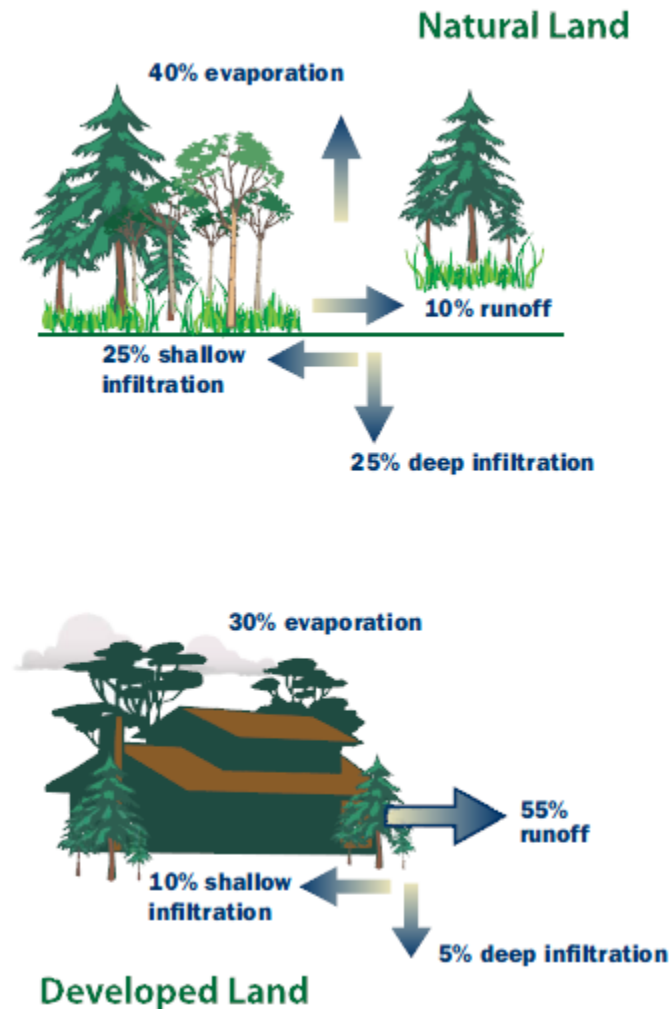
Source: Placer County

Stormwater Management and Subdivision Ordinance

Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see Figure 0-4). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

Figure 0-4 Runoff and Infiltration of Natural and Developed Land



There are three ways to prevent flooding problems caused by stormwater runoff:

- Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
- Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
- Set construction standards so buildings are protected from shallow water.

Most communities participate in the NFIP, which sets minimum requirements for regulating development in the floodplain. All new buildings must be protected from the base or 100-year flood and no development can cause an increase in flood heights or velocities.

Stormwater runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each

development must not let stormwater leave at a rate higher than what existed under pre-development conditions.

Standards for drainage requirements are typical in subdivision regulations. Standards for storm sewers, ditches, culverts, etc., are best set when an area is laid out and developed. Traditionally, the national standard is to require that the local drainage system carry the 10-year storm. Recently, communities are finding that older estimates of the 10-year storm understated the true hazard, so they are addressing larger storms.

One problem with requiring the drainage system to carry water away is that runoff increases with urban development. The runoff equivalent of a 10-year storm occurs more frequently, and from smaller storms. The problem is just sent downstream onto someone else's property.

Accordingly, modern subdivision regulations require new developments to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding.

If the storm sewers or roadside ditches cannot handle a heavy rain, the standard subdivision design uses the streets to carry excess runoff. If the flows exceed the streets' capacity, adjacent properties will flood. Therefore, the third approach to protecting from stormwater flooding is to make sure new buildings are elevated one or two feet above the street or above adjacent grade.

Local Implementation

Reduce Future Flood Losses

Current practices and tracking mechanisms are seeking to reduce flood risks. Future flood control and stormwater improvements in the County will help reduce localized flood risks by improving flood control mechanisms and drainage within the County. In order to reduce future flood losses, the County may consider revisiting their stormwater management ordinances.

Current Standards

Placer County has a stormwater management ordinance. Subdivision design standards require that subdivisions provide for adequate drainage of surface waters and erosion control. All land development must be related to the surrounding drainage pattern, with provisions made for proper drainage facilities. All drainage facilities shall be designed and engineered to carry surface and subsurface waters to the nearest adequate street, storm drain, natural watercourse, or other juncture. All areas shall be graded and drained so that drainage will not cause erosion or endanger the stability of any cut or fill slope or any building or structure. When surface drainage is discharged onto any adjoining property, it shall be discharged in such a manner that it will not cause erosion or endanger any cut or fill slope or any building or structure. Runoff shall not be discharged from the site in quantities or at velocities substantially above those which occurred before grading except into drainage facilities, whose design has been specifically approved by the community development resource agency. In addition, all natural drainage courses into which other

drainage courses empty shall be left undisturbed and shall be provided with adequate dedicated rights of way. Street alignment should follow contour lines or be generally parallel to drainage ways.

Subdivision Regulations

In addition to controlling stormwater runoff as described above, subdivision regulations govern how land will be subdivided and they set construction standards. These standards generally address roads, sidewalks, utilities, storm sewers, and drainage ways. They can include the following flood protection standards:

- Requiring that the final plat show all hazardous areas
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation

Local Implementation

Placer County implements local subdivision regulations which require hazard areas to be shown on the final plate. In addition, Placer County's subdivision regulations require, at a minimum, the following to protect the natural and beneficial functions of the floodplain:

- The subdivider shall design the subdivision so that it shall be protected from inundation, flood hazard, sheet overflow and ponding of local storm water, springs and other surface waters.
- The design of improvements shall be such that water occurring within the subdivision will be carried off such subdivision without injury to any improvements, residential sites, or residences to be installed on sites within the subdivision, or to adjoining areas or cause erosion or siltation that would be detrimental to the environment of the area.
- Waters occurring within the subdivision shall be carried to a storm drainage facility or to a natural watercourse by such improvements as may be required to meet the design standards herein set forth, and as outlined within the land development manual.
- Drainage design within the subdivision shall accommodate reasonably anticipated future development within the drainage area.
- Any off-tract outlet drainage facility required to carry storm water from the proposed subdivision to a defined channel or conduit shall be made adequate for the ultimate state of development in the drainage area.
- In any case when a watercourse traverses or serves a subdivision, adequate on-site and/or off-site easements for storm drainage purposes shall be provided.
- A storm drainage maintenance district or acceptable alternate which includes the entire subdivision shall be established for the maintenance of storm drainage facilities within the subdivision and any off-site drainage easements.
- If a storm drainage maintenance district has previously been established within a particular drainage area, where said subdivision is being proposed, the proposed subdivision shall be annexed to the existing district.
- In the event that the county has adopted a drainage plan for said particular drainage area, the subdivider shall be required to pay a fee consisting of a pro rata share of the cost of contracting or estimated cost of constructing drainage facilities within the drainage area.

CRS Credit

CRS credit is provided for both higher regulatory standards in the floodplain and stormwater management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

Conclusions and Recommendations

- Placer County has Flood Damage Prevention Regulations that exceed minimum national and state standards and will be helpful in preventing flood problems from increasing.
- As DFIRM maps change for Placer, the floodplain regulations for the County may need to be revisited.
- Placer County should continue to implement CRS activities. The County should consider amending its floodplain ordinance for additional higher standards.
- State administration of installation of mobile or manufactured homes does not guarantee that they will be adequately tied down or protected from flooding and other hazards.
- Most zoning ordinances do not designate floodprone areas for any special type of land use.
- Placer County should continue to enforce stormwater management best management practices to control post development site runoff. Consideration of a unified countywide stormwater ordinance will provide consistent regulations between all communities within the Placer County planning area.
- Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.

C.4.2. Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.

Flooding

There are five common methods to keep a flood from reaching and damaging a building:

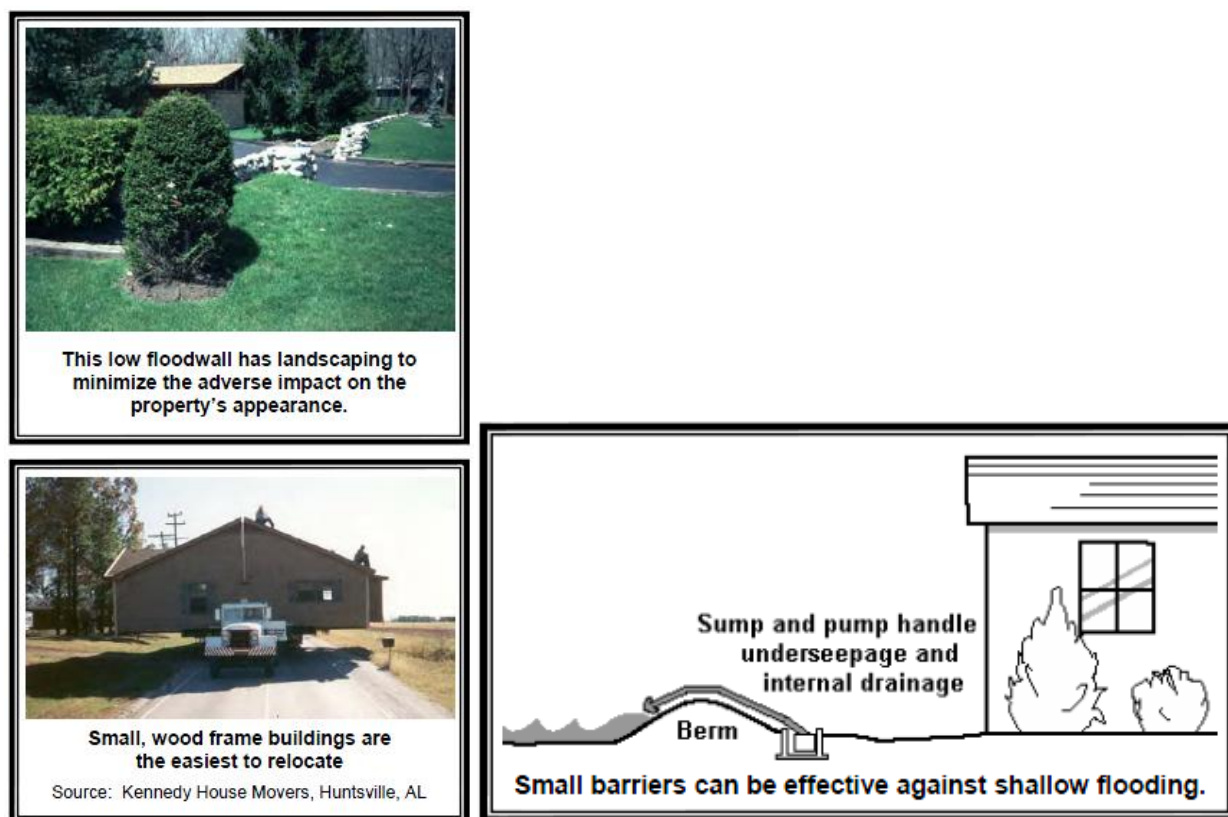
- Erect a barrier between the building and the source of the flooding.
- Move the building out of the floodprone area.

- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

Barriers

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Figure 0-5 Types of Barriers



Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings.

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards such as wind and groundshaking. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures ("pilot reconstruction"), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move - such as larger, slab foundation or masonry structures - and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

Figure 0-6 Demolition of Flooded Home



One problem that sometimes results from an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, are reluctant to leave their homes. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood and wind protection codes. This was formerly known as "demo/rebuild." FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option.

Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program's criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building's square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum federal grant is 75% of the cost, up to \$150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

Local Implementation

Within the Placer County planning area, acquisition projects have occurred within the City of Roseville, which is not a participant to this plan. However, following the 1995 floods, Placer County, through a hazard mitigation grant, elevated 38 structures along Miners Ravine and Dry Creek.

CRS Credit

The CRS provides the most credit points for acquisition and relocation, because this measure permanently removes insurable buildings from the floodplain. The CRS credits barriers and elevating existing buildings (Activity 530 - Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. Because barriers are less secure than elevation, not as many points are provided. Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain.

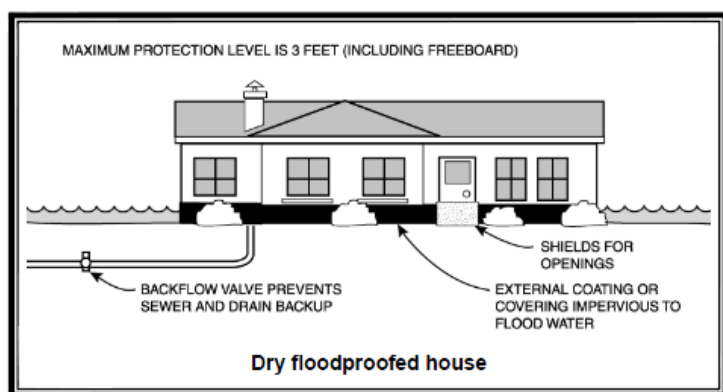
Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

Dry Floodproofing

Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Figure 0-7 Dry Floodproofing



Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Local Implementation

Dry flood proofing would likely be most appropriate for most of Placer County due to the current base flood elevations and the nature of flooding in the County (relatively low level flooding).

CRS Credit

Credit for dry and wet floodproofing and sewer backup protection is provided under Activity 530 - Retrofitting. Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area.

Figure 0-8 Flood Insurance Coverage

Table 5-1 Example Flood Insurance Premiums	
Building Exposure	Premium
In the Special Flood Hazard Area (AE Zone)	
Pre-FIRM ("subsidized") rate	\$1,689
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	\$440
1 foot above the base flood elevation	\$643
At the base flood elevation	\$1,167
1 foot below the base flood elevation	\$4,379
Outside the Special Flood Hazard Area	\$1,029
Premiums are for \$150,000 in building coverage and \$75,000 in contents coverage for a one story house with no basement and a \$500 deductible, <u>using the October 2008 Flood Insurance Manual. Premiums include the 5% Community Rating System discount in unincorporated St. Tammany Parish. Premiums are higher in the municipalities, which are not in the CRS.</u>	

Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

"If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] ... and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the maximum amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is \$500,000.]

[Communities] need to:

- Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.

- Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding...
- [Communities] must obtain and maintain insurance to cover [their] facility - buildings, equipment, contents and vehicles - for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. - FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

Local Implementation

NFIP insurance data indicates that as of August 21, 2020, there were 817 policies in force in the unincorporated County, resulting in \$233,180,600 of insurance in force. Of these, 802 are for residential properties; 15 are nonresidential. 249 of these are in A zones; 568 policies are for parcels in the B, C, & X zones. There have been 236 closed paid losses totaling \$4,788,314.79; 229 of these were for residential properties and 7 were nonresidential. Of these 236 paid losses, 102 were parcels in A zones and 120 parcels were in B, C, & X zones. Information was not provided on the other 4 claims. There are 44 repetitive loss (RL) structures, and 0 severe repetitive loss (SRL) structures in the County – with 60 paid losses totaling \$1,590,452.20. Of these RL buildings, 22 are in the A zones and 22 are in the B, C, or X zone. Only one of these RL buildings is a post-FIRM building. According to the County, only 9 RL properties are not mitigated. There have been 25 substantial damage claims since 1978.

CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles a municipality can play in encouraging and supporting implementation of these measures.

One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their "all-hazard" insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of certain Stafford Act provisions.

Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby.

Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project, but they cost the community less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented.

Pre-disaster funding sources:

- FEMA's Pre-Disaster Mitigation (PDM) grants
- FEMA's Flood Mitigation Assistance (FMA) grants
- Community Development Block Grants
- Conservation organizations, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Post-disaster funding sources:

- Insurance claims
- The NFIP's Increased Cost of Compliance. This provision increases a flood insurance claim payment to help pay for a flood protection project required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal cost-share of an elevation project.

Post-disaster funding sources, federal disaster declaration needed:

- FEMA's disaster assistance (for public properties). However, after a flood, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property.
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA's Hazard Mitigation Grant Program

Acquisition Agent

The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The local government could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases another public agency could assume ownership and the attendant maintenance responsibilities.

Mandates

Mandates are considered a last resort if information and incentives are insufficient to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that communities have to disconnect downspouts from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building, it is considered a "substantial improvement." The building must then be elevated or otherwise brought up to current flood protection codes.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of a separate ground fault interrupter circuits in the basement.

Local Implementation

Within Placer County several homes have been retrofitted for flood protection and others have been elevated, while no homes have been acquired and relocated. The largest retrofit project within the unincorporated county was after the 1995 flood event, along with the 38 elevations, located along Miners Ravine and Dry Creek.

CRS Credit

Except for public information programs, the CRS does not provide credit for efforts to fund, provide incentives, or mandate property protection measures. CRS credits are provided for the actual projects after they are completed. However, to participate in CRS, a community must certify that it has adequate flood insurance on all properties that have been required to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received federal aid, as specified by the Flood Disaster Protection Act of 1973.

Repetitive Loss Properties and Analysis

Repetitive loss properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the County planning area. Further, protecting repetitive loss buildings is a priority with FEMA mitigation funding programs.

Unincorporated Placer County's vulnerability to flooding is highlighted by its number of Repetitive Losses. According to the August 21, 2020 data from the state on NFIP communities, There are 44 repetitive loss (RL) structures, and 0 severe repetitive loss (SRL) structures in the County – with 60 paid losses totaling \$\$1,590,452.20. Of these RL buildings, 22 are in the A zones and 22 are in the B, C, or X zone. Only one of these RL buildings is a post-FIRM building. According to the County, only 9 RL properties are not mitigated. There have been 25 substantial damage claims since 1978.

Conclusions and Recommendations

- There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.
- Property protection measures can protect the most damage-prone buildings in the County planning area including repetitive loss properties.
- 29% of the buildings in the floodplains in unincorporated Placer County are covered by flood insurance, up from less than 19% from the 2016 LHMP.
- Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, and thunderstorms). For other measures, such as relocation and elevation, the owners may need financial assistance.
- Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
- It is unlikely that most government properties, including critical facilities, have any special measures to protect them from flooding.
- Because properties in floodplains will be damaged at some point, efforts should continue to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.
- Public education materials can be developed/enhanced to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available.
- All property protection projects should be voluntary. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance.
- A FEMA Hazard Mitigation Assistance (HMA) Grant workshop focused on private firms and citizens could be conducted annually to showcase the assistance that FEMA (HMGP, BRIC, FMA, RFC and SRL) provides and to encourage public participation.
- A standard checklist could be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public.
- Placer County should evaluate its own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.
- Placer County should protect their own publicly owned facilities with appropriate mitigation measures.

C.4.3. Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge

- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Section 5.3 Preventive Measures of the base plan. This section covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

- Wetland protection
- Erosion and sedimentation control
- River restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

Wetland Protection

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under Section 404 of the Clean Water Act. Before a "404" permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps, County, or one of the cities, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.

When a wetland is mitigated at a separate site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it is in a different watershed) will not have the same flood damage reduction benefits as the original one did.

Local Implementation

Placer County has ordinances that reduce the ability to develop near a wetland. The building and development section of the municipal code restricts grading and soil disturbances in wetlands, drainage ways, stream environment zones, or water bodies.

CRS Credit

The CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers' 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations.

The CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers' 404 regulations, there is credit for maintaining water quality buffers that protect streams, rivers, lakes and shorelines in their natural condition or restoring them to an approximate natural state. Credit is also available for an approved habitat conservation plan.

Erosion and Sedimentation Control

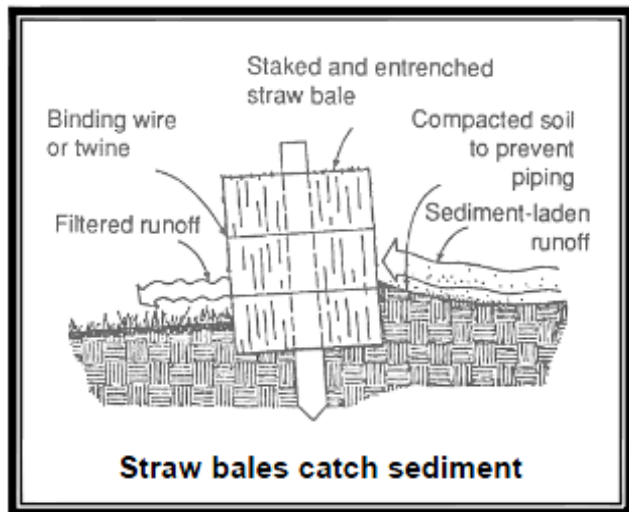
Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.

Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more sediment is left in the channels. The result is either clogged streams or increased dredging costs.

Not only are the drainage channels less able to perform their job, but the sediment in the water reduces light, oxygen and water quality, and often carries chemicals, heavy metals and other pollutants. Sediment has been identified by the US EPA as the nation's number one nonpoint source pollutant for aquatic life.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

Figure 0-9 Erosion Control



If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds). Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

Local Implementation

The County has ordinances that include standards for erosion and sedimentation control. The Placer County Flood Control District has an annual stream clearing program. Placer County completed water quality monitoring in the Truckee River Basin and monitors sediment loading the Lake Tahoe Basin.

CRS Credit

Local governments whose ordinances include erosion and sedimentation control provisions can qualify for up to 45 points for this measure.

River Restoration

There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks and

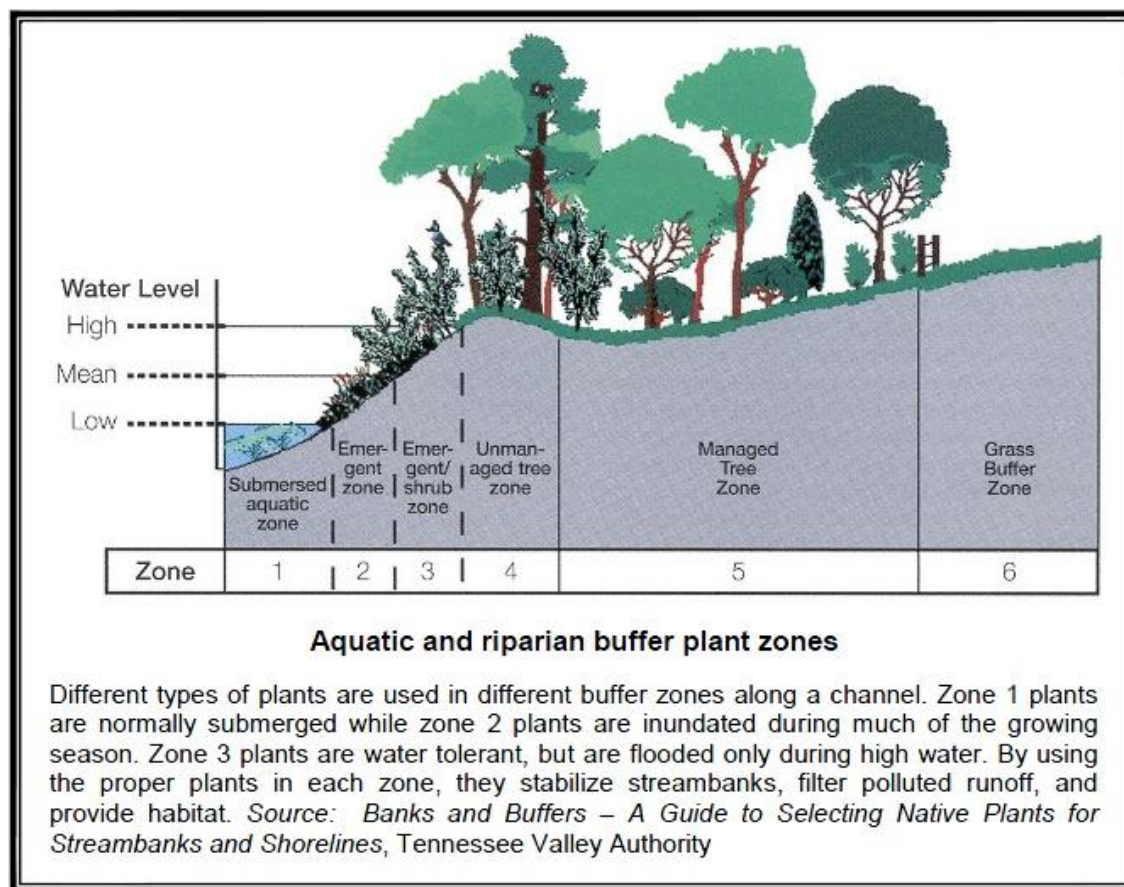
adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

Figure 0-10 River Restoration Zones



Local Implementation

Placer County has implemented these activities for water quality and floodplain management purposes. See <https://www.placer.ca.gov/DocumentCenter/View/50871/PCCP-Requirements-Stream-System-Grading-Permits?bidId=>

CRS Credit

The CRS focuses on activities that directly affect flood damage to insurable buildings. However, there are credits for preserving open space in its natural condition or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines. Placer County currently receives some credit for open space conservation.

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA and the California Department of Water Resources. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

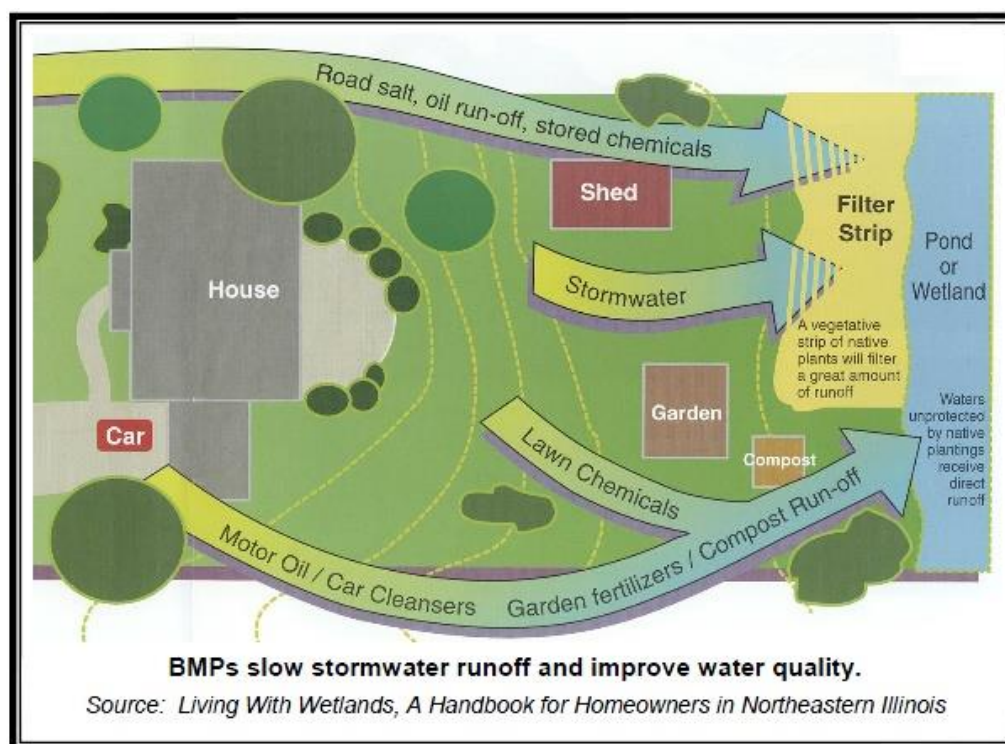
Local Implementation

Placer County participates in the National Pollutant Discharge Elimination System permitting program and require BMPs to minimize stormwater impacts.

CRS Credit

A community can receive CRS points if regulations require new developments to include in the design of their permanent stormwater management facilities appropriate BMPs that will improve the quality of surface waters.

Figure 0-11 Stormwater Best Management Practices



Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many communities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regarding their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Local Implementation

Placer County ordinances makes it unlawful for anyone to deposit waste, grass, weeds, brush or other refuse in any street, ditch or watercourse, or on others' property, or on public property. It is also illegal to dispose of certain wastes in public sewers.

CRS Credit

The CRS provides credit for enforcing and publicizing a regulation that prohibits dumping in the drainage system.

Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Figure 0-12 Floodplain Damages to Farmland



Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes cropland, rangeland, grassland, pastureland, or forest land that is part of an agricultural operation. Certain lands within historical or archaeological resources are also included.

The hazard mitigation benefits of farmland protection are similar to those of open space preservation:

- Farmland is preserved for future generations,
- Farmland in the floodplain keeps damageable structures out of harm's way,
- Farmland keeps more stormwater on site and lets less stormwater runoff downstream,
- Rural economic stability and development is sustained,
- Ecosystems are maintain, restored or enhanced, and
- The rural character and scenic beauty of the area is maintained.

Local Implementation

Placer County currently requires farmland protection provisions under the Williamson Act.

CRS Credit

Credit is given for preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for density zoning of floodprone areas.

Conclusions and Recommendations

- A hazard mitigation program can use resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.
- Placer County ordinances prohibit illicit discharges into public sewers or onto public or private property.
- Preserving farmland in the floodplain will maintain open space and prevent damage to homes, businesses, and other development.
- The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained.
- Placer County may consider publicizing its illicit discharge rules more widely.
- The public should be informed about the need to protect streams and wetlands from dumping and inappropriate development and the relevant codes and regulations.

C.4.4. Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. At the state level, emergency services programs are coordinated by the California Office of Emergency Services (Cal OES). Locally, emergency services are coordinated by the Placer County Office of Emergency Services.

This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

Threat Recognition

The first step in responding to a flood, storm, or other natural hazard is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats, such as tornadoes, thunderstorms and winter storms. Severe weather warnings are transmitted through NOAA's Weather Radio System. Federal agencies can only look at the large scale, e.g., whether conditions are appropriate for the formation of a thunderstorm. Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning.

Severe snow storms can often be forecast days in advance of the expected event, which allows time for warning and preparation. Though more difficult, the NWS can also forecast ice storms.

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS, a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Local Implementation

The County has an Emergency Operations Plan which is currently being updated in 2021 that includes procedures for threat identification. The County is not currently a StormReady certified County. StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education, and awareness. Placer County OES does, however, work closely with the National Weather Service for issuing an Emergency Alert System (EAS). Additional County's threat identification mechanisms include:

ALERT System. The County's network of ALERT Flood Warning gauges, including numerous precipitation gages and stream level gages located throughout western Placer County provide real time monitoring information on current flood conditions which assist in informing the activation of additional warning and evacuation of affected areas.

Dam Protocols. Should an event trigger the activation of an Emergency Action Plan (EAP) for a potential dam failure, County OES receives this information via direct phone calls from the originating source/agency

or from PCSO Dispatch and/or Cal OES. County OES then follows the notification and evacuation procedures called for in the EAP.

CRS Credit

Credit can be received for using river flood stage predictions for the NWS's gages. The actual score is based on how much of the community's floodplain is affected by these systems. Potential CRS credit is possible under Activity 610 - Flood Warning Program and Response.

Warning

After the threat recognition system tells the emergency services office that a flood, tornado, thunderstorm, or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. More people can implement protection measures if warnings are early and include specific detail.

The NWS issues notices to the public using two levels of notification:

- Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
- Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Placer Alert/Everbridge
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Multiple or redundant systems are most effective - if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on. They are most appropriate for hazards that develop over more than a day, such as a tropical storm, hurricane, or winter storm.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their televisions for more information, but not everyone has a Weather Radio.
- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television when they hear the siren.

- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers, call screening services, or cellular service, unless people sign up for notifications.
- Where a threat has a longer lead time, going door-to-door and manual telephone trees can be effective.

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect. Citizens should know the difference between a tornado warning (when they should seek shelter in a low spot), a flood warning (when they should stay out of low areas), and other appropriate warnings and responses.

StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,
- Have more than one way to receive severe weather warnings and forecasts and to alert the public,
- Create a system that monitors weather conditions locally,
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

Local Implementation

The Placer County Office of Emergency Services serves as the emergency manager during an emergency. Local police and fire departments are also responsible for enforcing actions required during an emergency. In the event of a severe flood, wildfire or other natural hazard event, the Placer County OES webpage will identify current emergencies at: <https://www.placer.ca.gov/1379/Current-Emergency-Information>. The County will also provide emergency information and broadcast warnings on local radio and television stations as well as on social media websites such as Facebook and Twitter. The new Everbridge system, described further below, may be activated and helicopters may be used to broadcast warnings/alerts via a PA system. If time and condition/safety permits, vehicle patrol units may also broadcast warnings in affected areas.

Everbridge. In 2015, Placer County and all participating cities to this plan established the Everbridge/Placer Alert System employed for issuing flood warnings, alerts and evacuation notices to the public. The Placer County Flood Control and Water Conservation District coordinated with County OES, Sheriff, County Planning, and Department of Public Works for this system. Flood warning zones across the County were created and Sheriff's dispatch is the lead agency in employing Everbridge and issuing specific flood event warnings as necessary. The District will continue to assist during an event by providing technical input to OES as to the need for a warning issuance as well as any resulting evacuations.

CRS Credit

Community Rating System points are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more points if there are additional measures, like telephone trees. Being designated as a StormReady community can provide additional points. These credits are in Activity 610 - Flood Warning Program and Response.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness),
- Closing streets or bridges (police or public works),
- Shutting off power to threatened areas (utility company),
- Passing out sand and sandbags (public works),
- Holding children at school or releasing children from school (school superintendent),
- Opening evacuation shelters (the American Red Cross),
- Monitoring water levels (public works), and
- Establishing security and other protection measures (police).

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

A flood stage forecast map shows areas that will be under water at various flood stages. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, and who to warn. With this information, an advance plan can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Local Implementation

Placer County Office of Emergency Services serves as the Emergency Manager for the County. Response is provided cooperation with the County Sheriff, city police, and fire departments. The Placer County Emergency Operations Plan (currently being updated in 2021) includes addresses the planned response to emergency situations associated with natural disasters and emergencies in or affecting Placer County. The EOP is intended to facilitate multi-agency and multi-jurisdictional coordination in emergency operations.

It seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system to return the County the local jurisdictions to their normal state of affairs.

CRS Credit

The CRS program provides credit under Activity 610- Flood Warning for a warning system that effectively notifies residents of a flood and has procedures for testing and monitoring the system.

Evacuation and Shelter

According to Emergency Management: Principles and Practice, "The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger." There are six key ingredients to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., the handicapped, prisoners, hospital patients, and schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

Local Implementation

The Placer County EOP includes multiple annexes, one of which is the Mass Evacuation Annex. This Annex addresses evacuation policies and procedures due to natural hazards and other events. Emergency evacuation planning involves multiple governmental agencies and private organizations performing such functions as threat identification, warning, evacuation decision making, communications, traffic control, and shelter and medical needs management. A component of this is Pre-Disaster Public Awareness and Education which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident.

In addition to the Mass Evacuation Annex to the EOP, the County has several evacuation plans covering various areas of the County.

CRS Credit

Because it is primarily concerned with protecting insurable buildings, the CRS does not provide any special credit for evacuation or sheltering of people (minimal credit is given in Activity 510 - Floodplain Management for evacuation policies and procedures). It is assumed that the emergency response plan would include all necessary actions in response to a flood.

Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting,
- Providing safe drinking water,
- Monitoring for diseases,
- Vaccinating residents for tetanus and other diseases,
- Clearing streets, and
- Cleaning up debris and garbage.

Throughout the recovery phase, everyone wants to get "back to normal." The problem is that "normal" means the way they were before the disaster, exposed to repeated damage from future disasters. There should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work,
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs,
- Identifying other mitigation measures that can lessen the impact of the next disaster,
- Acquiring substantially or repeatedly damaged properties from willing sellers,
- Planning for long-term mitigation activities, and
- Applying for post-disaster mitigation funds.

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

This requirement can be very difficult for understaffed and overworked offices following a disaster. However, if these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP. In some areas, mutual aid agreements have been established so building inspectors from a community not affected by the disaster can work in the communities that were hit the hardest.

Local Implementation

The Placer County EOP has post-disaster recovery policies in place for the County. The Placer County EOP is intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through its policies and procedures it seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhanced response during emergencies and provide necessary assistance, and establish a recovery system in order to return the

community to their normal state of affairs. The County is in the process of updating the EOP and annexes in 2021. Post disaster recovery procedures for all hazards, including flood, are primarily addressed the Recovery Annex to the EOP, and are detailed further in Section 4.4 of the base plan.

CRS Credit

The CRS does credit post-disaster mitigation procedures if the policies and procedures are incorporated into a flood mitigation or multi-hazard plan through Activity 510 - Floodplain Management Planning.

Conclusions and Recommendations

- Placer County should consider StormReady certification.
- There are several threat recognitions systems that can provide the County with advance notice of an impending emergency.
- Placer County depends on local media outlets, sirens, telephones and door-to-door notices to warn residents. These media should reach most people who need to know of a threat.
- Emergency management guidance could be very helpful when things happen quickly and for hazards that have predictable impacts, such as tornado, winter storms and flooding.
- Placer County should update and exercise its EOP on a regular basis.
- Placer County and its jurisdictions should continue to work together to protect people before and after a disaster including an outreach program to promote each community's warning system.

C.4.5. Flood Control Measures

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings,
- Many projects can be built without disrupting citizens' homes and businesses, and
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

- Advantages
 - ✓ They may provide the greatest amount of protection for land area used.
 - ✓ Because of land limitations, they may be the only practical solution in some circumstances.
 - ✓ They can incorporate other benefits into structural project design, such as water supply and recreational uses.
 - ✓ Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.
- Disadvantages
 - ✓ They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat.
 - ✓ They require regular maintenance, which if neglected can have disastrous consequences.

- ✓ They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
- ✓ They can create a false sense of security, as people protected by a project often believe no flood can ever reach them.
- ✓ Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour. Key considerations when evaluating the use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- Mitigation of adverse impacts to wetlands and other habitats,
- Loss of river access and views, and
- Creating a false sense of security, because while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee.

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits, a setback levee is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Figure 0-13 Retention Pond



Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to be stored.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

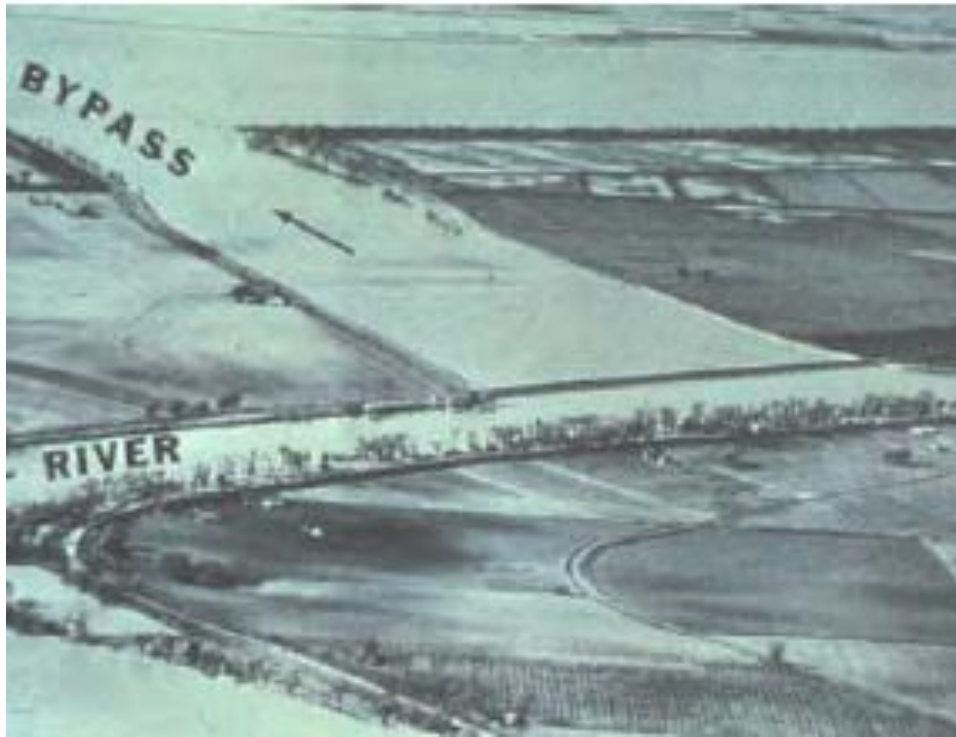
There are several considerations when evaluating the use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's dam fail,
- There is a constant expense for the management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrient levels, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream

Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Figure 0-14 Diversion



Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

Dredging

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless in-stream or tributary erosion is corrected upstream, the dredged areas usually fill back in within a few years, and the process and the expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.

Figure 0-15 Dredging Activity



To protect the natural values of the stream, federal law requires a U.S. Army Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires a lot of advance planning and many safeguards to protect habitats, which adds to the cost of the project.

CRS Credit

Structural flood control projects that provide 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to avoid duplicating the larger premium reduction provided by removing properties from the mapped floodplain.

The CRS credits smaller flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood,
- They must meet certain environmental protection criteria,
- They must meet federal, state and local regulations, such as the Corps of Engineers' 404 permit and California Division of Dam Safety for dam safety rules, and
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted. Any of the measures reviewed in this section would be recognized under Activity 530 - Flood Protection, although it would be very hard to qualify a dredging project. Credit points are based on the type of project, how many buildings are protected, and the level of flood protection provided.

Local Implementation

In coordination with California Department of Water Resources and the Placer County Flood Control and Water Conservation District, flood control and drainage facilities are being brought to current standards of flood protection and prevention.

Conclusions and Recommendations

- The County has previously received funding for construction of flood control and drainage facilities that will move storm and flood waters more efficiently and reduced potential for overbank flooding. The County is also considering additional projects in the Placer County Planning Area.
- Placer County, the cities, and special districts should continue to implement countywide drainage improvement projects to reduce the potential from overbank flooding along local drainages and flooding from localized stormwater events.

C.4.6. Public Information Measures

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, and businesses about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others.

Information can bring about voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before government funding programs existed. The typical approach to delivering information involves two levels of activity. The first is to broadcast a short and simple version of the message to everyone potentially affected. The second level provides more detailed information to those who respond and want to learn more.

This section starts with activities that reach out to people and tell them to be advised of the hazards and some of the things they can do. It then covers additional sources of information for those who want to learn more. It ends with a general public information strategy.

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Research has shown that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to gain their interest. After a flood in another community, people and the media become interested in their flood hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Other approaches: Examples of other outreach projects include:

- Presentations at meetings of neighborhood, civic or business groups,
- Displays in public buildings or shopping malls,
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to the hazards (such as floods),
- Brochures available in municipal buildings and libraries, and
- Special meetings, workshops and seminars.

Local Implementation

Placer County maintains a website that provides in-depth flood protection information. The County also provides a direct mailing annually to residents, with a focus on repetitive loss areas, which include flyers on flood protection and property protection measures. The County also provides direct mailings on flood protection information to insurance brokers and realtors located throughout the County. In addition, the County's flood protection and stormwater group also conduct and participate in a variety of public community events throughout the year such as community fairs, river runs, river cleanups, etc. and provide information to the public on stormwater management and flood protection measures. The County also has a variety of flood materials placed in public locations.

CRS Credit

The Community Rating System provides credit for outreach projects which cover six flood-related topics. Credit is also available for producing flood response materials. Another way to achieve credit for outreach is for producing a plan for public information (PPI). A 40% bonus is applied to outreach credits which are included in a PPI.

Real Estate Disclosure

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if they had known they had purchased a property exposed to a hazard. There are some federal and state requirements about such disclosures, but they have their limits.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the Flood Insurance Rate Map. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, the applicant is often already committed to purchasing the property when he or she first learns of the flood hazard.

State law: State laws set standards for real estate sales and licensing of agents and brokers.

Local Implementation

Placer County receives credit for providing for the local real estate agents disclosure of flood hazards to prospective buyers. Credit is also provided for state and community regulations requiring disclosure of flood hazards.

CRS Credit

Communities in areas that have additional disclosure requirements are eligible for five points under the "Other disclosure requirements" as well as 10 points for the "Disclosure of other hazards."

Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes and floods or a website about floods for children. The "FEMA for Kids" website teaches children how to protect their home and what to have in a family disaster kit.

Local Implementation

Placer County provides a variety of flood materials placed in public locations, including public buildings such as County Public Works Department and public libraries. The County also has an extensive flood protection websites at: <http://www.placer.ca.gov/departments/Works/FloodControl.aspx>

CRS Credit

The Community Rating System provides credit for having a variety of flood references in the local public library and additional credits for similar material included on municipal websites (Activity 350 - Flood Protection Information).

Technical Assistance

Hazard Information

Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Real

estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.

Communities can easily provide map information from FEMA's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track.

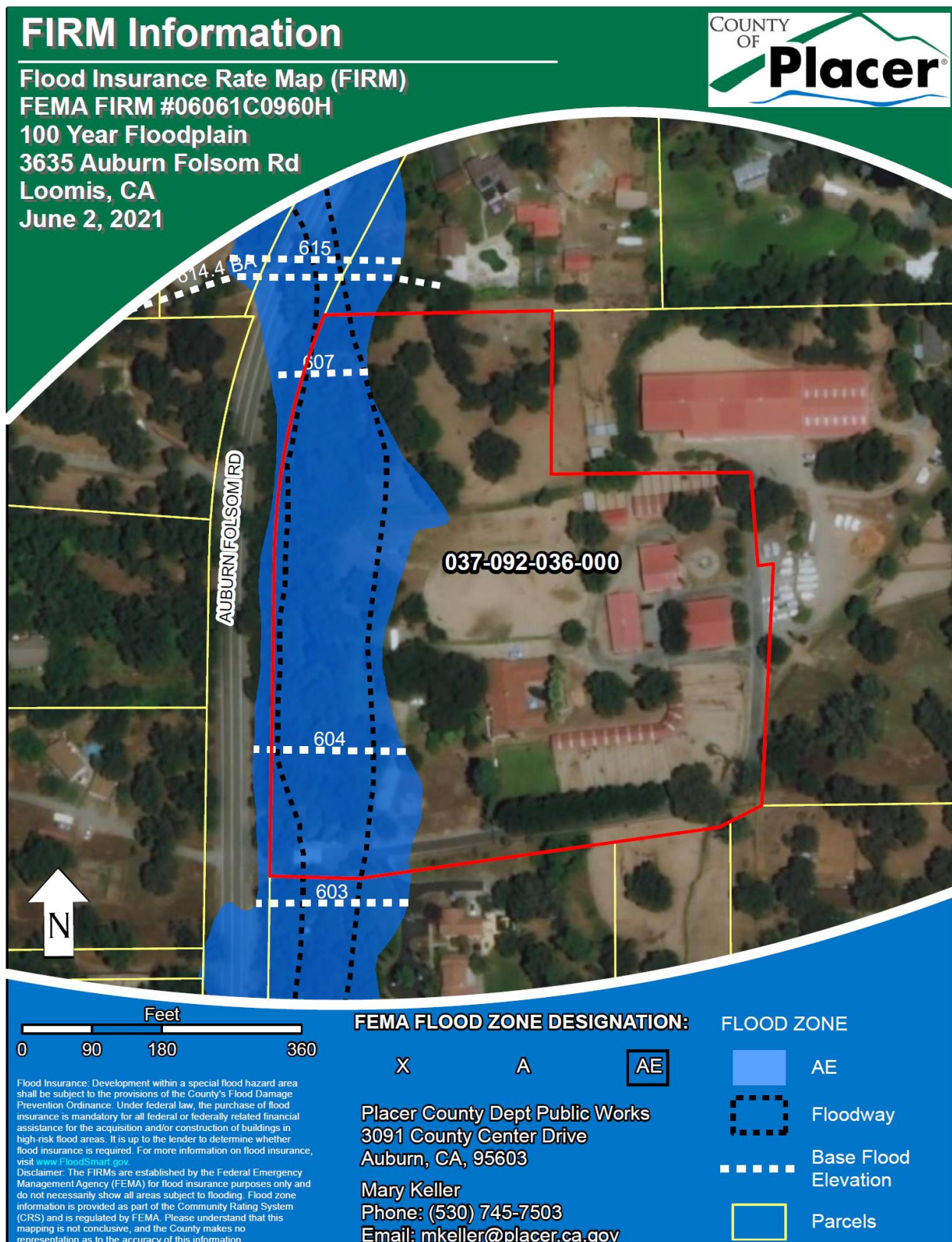
- Building or public works department staffs can provide the following types of assistance:
- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation,
- Provide advice on protecting windows and garage doors from high winds, and
- Explain when building permits are needed for home improvements.

There is a concern that a local official might provide the wrong information and the community would be sued if a project failed. To counter this, there are guidelines for local programs and training on how to identify the right measures. FEMA conducts a free week-long course at its Emergency Management Institute on property protection measures for flooding. FEMA and the Corps of Engineers periodically conduct one- or two-day retrofitting workshops.

Local Implementation

FEMA floodplain maps are available on FEMA's website, which is linked through the Placer County Floodplain Management website. The County also responds to requests on whether a property is located in a Special Flood Hazard Area. (see Figure 0-16 for example of what is provided on a floodplain determination request). The County also maintains elevation certificates for many existing homes within or near the SFHA. Elevation Certificates and LOMA's are listed on Placer County's website. Placer County is working with FEMA to update the current SFHA mapping completed in 2018 and expects an update for specific watershed labeled as Zone A without BFE to Zone AE with BFE in 2022.

Figure 0-16 Placer County Floodplain Determination



CRS Credit

The Community Rating System provides points for providing map information to inquirers. Points are available for providing one-on-one flood protection assistance to residents and businesses and for making site visits. Both services must be publicized.

Public Information Program Strategy

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A strategy consists of the following parts, which are incorporated into this plan:

- The local flood hazard (discussed in Chapter 4 of this plan)
- The property protection measures appropriate for the flood hazard (discussed in Chapter 5 of this plan)
- Flood safety measures appropriate for the local situation (discussed in Chapter 5 of this plan)
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies (discussed in Chapter 4 of this plan and jurisdictional annexes)
- Goals for the community's public information program (discussed in Chapter 3 and 5 of this plan)
- The outreach projects that will be done each year to reach the goals (discussed in Chapter 5 of this plan)
- The process that will be followed to monitor and evaluate the projects (discussed in Chapter 7)

Figure 0-17 illustrates several flood safety tips that can be used in an outreach campaign to better inform the public of the hazards associated with flooding.

Figure 0-17 Flood Safety Tips for Outreach Campaign

Flood Safety

Pay attention to evacuation orders. Listen to local radio or TV stations for forecasts and emergency warnings. Know about evacuation routes and nearby shelters and have plans for all family members on how to evacuate and where to meet if you're split up during an emergency.

Do not drive through a flooded area. During a flood, more people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Do not walk through flowing water. Flash flooding is the leading cause of weather-related deaths in the U.S. Currents can be deceptive; 6 inches of moving water can knock you off your feet in a strong current. If you walk in standing water, use a stick to help you locate the ground.

Stay away from power lines and electrical wires. Electrical currents can travel through water. Report downed power lines to the police or sheriff by calling 911.

Have the power company turn off your electricity. Some appliances, like TV sets, keep electrical charges even after they've been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.

Look before you step. After a flood, the ground and floors are covered with debris like broken bottles and nails. Floors and stairs that are covered with mud can also be slippery.

Be alert for gas leaks. Use a flashlight to inspect damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been shut off and the area has been ventilated.

Look out for animals that may have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to turn things over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris. Floors and stairs that have been covered with mud will be very slippery.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly – cook with charcoal outdoors.

Clean everything that got wet in the flood. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, and flooded cosmetics and medicines can be health hazards. When in doubt, throw it out.

Take care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

Local Implementation

Placer County conducts a public information campaign using a variety of mechanisms to inform residents of the flood and other hazards and to provide information to foster better floodplain management throughout the County Planning Area. An overview of the County's outreach efforts can be seen at: <https://www.placer.ca.gov/1498/Floodplain-Management>. The County does not currently utilize a PPI for outreach.

CRS Credit

The CRS provides up to 350 points for a Plan for Public Information (PPI).

Conclusions and Recommendations

- There are many ways that public information can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves.
- Libraries and websites are currently being used as public information tools in Placer County.
- The most important topics to cover in public information activities are:
 - ✓ Safety precautions for all types of hazards, but especially tornados, earthquakes, thunder storms, winter storms, wildfires, and floods.
 - ✓ Knowing where emergency evacuation shelters are in town.
 - ✓ Flood protection measures, including rules for new construction and insurance.
 - ✓ Keeping drainage ways clear and protection from local drainage problems.
 - ✓ Family and emergency preparedness measures.
 - ✓ What the County and cities are doing and sources of assistance.
 - ✓ Protecting water quality and wetlands and the benefits of open space.
- The most appropriate ways to spread this information are:
 - ✓ Websites and social media
 - ✓ Mailings to everyone, in utility bills or otherwise
 - ✓ News releases or newspaper articles
 - ✓ Newsletters
 - ✓ Displays, particularly at special events
 - ✓ Handouts, flyers and other materials, which can be distributed at special events and presentations
- County and City staff should continue to reach out to residents, civic organizations and other organizations to help spread the word about flood hazards, flood protection, and safety measures.